HISTORY *and* BIBLIOGRAPHY *of* ANATOMIC ILLUSTRATION

LUDWIG CHOULANT

TRANSLATED AND EDITED
BY MORTIMER FRANK

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HISTORY AND BIBLIOGRAPHY OF ANATOMIC ILLUSTRATION

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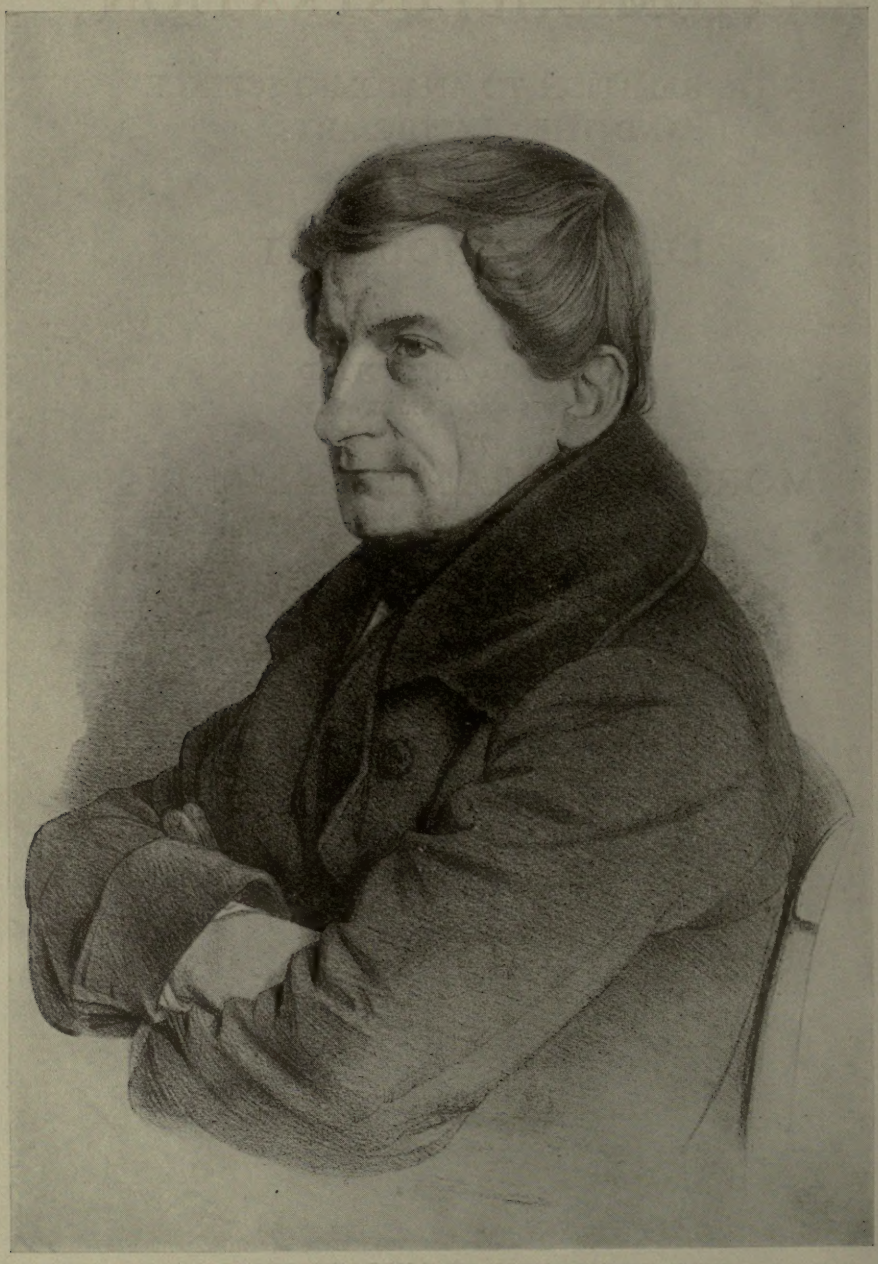

JOHANN LUDWIG CHOULANT

HISTORY AND BIBLIOGRAPHY OF ANATOMIC ILLUSTRATION

IN ITS RELATION TO ANATOMIC SCIENCE AND THE GRAPHIC ARTS

BY

LUDWIG CHOULANT

UNIVERSITY OF TORONTO LIBRARY

TRANSLATED AND EDITED
WITH NOTES AND A BIOGRAPHY
BY

MORTIMER FRANK, B.S., M.D.
Secretary, The Society of Medical History, Chicago;
Attending Ophthalmologist, Michael Reese Hospital, Chicago

WITH A BIOGRAPHICAL SKETCH OF THE TRANSLATOR
AND TWO ADDITIONAL SECTIONS
BY
FIELDING H. GARRISON, M.D., AND EDWARD C. STREETER, M.D.

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DER

ANATOMISCHEN ABBILDUNG

NACH IHRER BEZIEHUNG

AUF

ANATOMISCHE WISSENSCHAFT UND BILDENDE KUNST.

VON

Dr. LUDWIG CHOULANT,

KÖNIGL. SÄCHS. GEH. MEDICINALRATH.

NEBST EINER AUSWAHL VON ILLUSTRATIONEN

NACH BERUEHMTEN KUENSTLERN,

HANS HOLBEIN, LIONARDO DA VINCI, RAFAEL, MICHELANGELO BUONARROTI, ROSSO DE' ROSSI, STEPHAN VON CALCAR, ARPHE, RUBENS, BERRETTINI DA CORTONA, REMBRANDT VAN RYN, GERARD DE LAIRESSE, WANDELAER, FLAXMAN, HAMMAN U. A.

IN 43 HOLZSCHNITTEN UND 3 CHROMOLITHOGRAPHIEEN

BEIGEGEBEN VON

RUDOLPH WEIGEL.

LEIPZIG,
RUDOLPH WEIGEL.
1852.

TO HIS ESTEEMED FRIEND AND COLLEAGUE
ROYAL COUNCILOR
DR. HEINRICH WILHELM SCHULZ
THE AUTHOR
DR. LUDWIG CHOULANT
DEDICATES THIS WORK
WITH SINCERE ESTEEM
IN GRATEFUL REMEMBRANCE OF THE
INSTRUCTIVE DAYS
AT
NAPLES, SALERNO, PAESTUM,
AND PALERMO

I DEDICATE THIS TRANSLATION TO
MY WIFE
AS A SLIGHT RECOGNITION OF
HER CONSTANT PATIENCE
AND DEVOTION

AUTHOR'S PREFACE

The purpose of this book is a presentation of the history and the bibliography of representations of human anatomy by graphic means. Due consideration has been given both to anatomic illustration and to representations belonging to the graphic or plastic arts. For a satisfactory attainment of his purpose, the author will first present a brief historical introduction (pp. 22 to 41), which will be followed by explanatory sections (pp. 42 to 357), in order to avoid crowding the introduction with confusing details.

The historic character of the work necessarily set a certain time-limit to both lines of consideration, to the scientific as well as to the artistic.

The earlier period of anatomic illustrations ends with Soemmerring and Mascagni. With increasing needs, a new era sets in, differing from the preceding one in its conception of the graphic arts and in the use of new tools and means of reproduction. The development of histologic and microscopic anatomy, the employment of lithography, steel engraving, the daguerreotype, the modern woodcut, and other graphic means, all brought about manifold changes in the methods of anatomic representation. This epoch has no place within the domain of historic research, but has to do rather with a critical appreciation of the literary demands and resources of the present time and of modern science. For this reason the treatment of the subject concludes with the two anatomists above mentioned, adding only the two most important collective works of a later time, those of Loder and Caldani, which were necessarily characteristic of the former period, since they presented only material belonging to it.

As regards illustration for the needs of the graphic and plastic arts, that is, in behalf of artistic anatomy, some of their different historic epochs occur earlier and are duly pointed out. At the time of the above-mentioned conclusion of an epoch in scientific anatomy there is no noticeable falling off in illustrations in aid of artistic anatomy. It became necessary, therefore, to enumerate all anatomic illustrations for the use of artists up to the present time, which has been done. Besides this limitation of the periods of time within which this work was to be confined, a careful selection of appropriate material was no less necessary.

To fulfil the conditions of a true survey, the historic introduction itself must needs be confined to the principal points and to matters of

historic importance. But even in the explanatory sections a selection of material was necessary. The two lines of consideration, that of scientific anatomy on the one hand and artistic anatomy on the other, have rendered these selections, no less than the time-limits, different.

In selecting anatomical works particular attention has been paid to the lasting influence and the historic significance of individual works. An attempt has been made, however, to present the output of the fifteenth century and of the period up to and including Vesalius in its entirety, and to furnish an almost equally complete presentation for the rest of the sixteenth century. During the second half of the sixteenth century, and even more so during the seventeenth and eighteenth centuries, a greater restriction in choice became necessary. The greater importance of a work and its completeness as regards the representation of all parts of the human body became the determining factors in selecting the material. For this reason, those anatomists, who merely furnished monographs on single organs or random observations, have but rarely been mentioned. For the same reason, all illustrations pertaining to zoötomy and to surgical and pathologic anatomy have been excluded or have been treated only incidentally. The chief purpose of the individual sections is to give a clear and vivid idea of the historic introduction and to follow it conscientiously.

In selecting works on artistic anatomy, we have adhered to the decision that mere sketchbooks, even though containing some anatomy, and works dealing with the proportions of the human body, without going into the anatomic side of the subject, were to be excluded. As might be concluded from the preceding paragraph, no consideration has been given to representations dealing not with the human body, but with the animal and other subjects. Of anatomic works, which are really proper to our subject, no selection as to value and importance has been made, because the number of books on artistic anatomy and of writings dealing with it is far smaller than that of works on scientific anatomy. Thus it has been attempted to give a complete list of all works on artistic anatomy from earliest times up to the present. Since such a task has never before been accomplished in any completeness, it may prove a welcome gift to many a reader.

Only with such restrictions could the chief purpose of the book be accomplished and a true picture of the course of development of anatomic representation be rendered. After allowing for individual tastes and after due deliberation, the reader will readily understand how, owing to such principles of selection, many an anatomic work has been men-

tioned which may be regarded as less important by many readers, or how, on the other hand, many a work has been passed over which may seem to some readers of greater importance than some of the included material. We must bear in mind that this book is not intended to contain a history of anatomy, nor a history of anatomists, nor even a history of anatomic discoveries. It is merely a history of anatomic illustration, following the two lines previously indicated, i.e., that of scientific anatomy and that of artistic anatomy.

In regard to the different sections, however, they are mainly biographic-literary notes on different anatomists or artists, with the exception of a few chapters of a collective nature. In each section it has been attempted to present, over and above the characteristics of the individual and his achievements, all the historic, literary, and biographic facts as correctly as possible, and with all the details necessary for such research work. For in all researches of a historic-literary or a historic-artistic nature, mere copying of facts or a superficial treatment are not only absolutely useless but actually harmful, since they tend to increase errors and confusion even to the point of blotting out all historic truth. Researches of this kind, in order to possess any value at all, must be exhaustive as far as means and individual abilities permit, or must at least be carried to a point where a successor more able and more resourceful can find a secure basis for a new start. Nobody will, therefore, object to the bibliographic exactness which, along with the historical, has everywhere been attempted. Bibliographic exactness is the only thing which can make later investigations possible and render credible beyond peradventure the documents upon which the literature and the history of the fine arts are based. Aside from this a title correct as to bibliography takes up no more space than one treated more superficially. Moreover, the desire to possess some of the literary productions dealt with in this book, or to build up collections along one line or the other, is aroused more frequently than with other old books. Directions which purpose to familiarize the buyer or the collector with the most excellent productions, and which put everyone in a position to protect himself from deceptions and to acquire something of lasting value, at a moderate cost, and suitable for his purpose should, therefore, be welcome. But there is certainly very little good information to be found in general works on the literature and history of fine arts as regards the subjects treated in this book, because these subjects are quite out of the range of the average littérateur and art connoisseur. In anatomic and medical works just as little is usually given, since

the historic-literary and -artistic points of view are quite as foreign to their readers.

For this exactness and reliability, and in order to make possible at any later time the resumption of these researches, I thought it also necessary to mark with an asterisk (*) everything which I myself have examined. As one will notice, not a little of the material is thus marked. Indeed, only the wealth of material at my disposal could determine me to undertake a work which, however imperfect otherwise, is sure to remain a contribution pleasing and useful to the littérateur and the lover of the fine arts, on account of its authentic citations and the new material introduced.

Dresden, through its public and private collections, offers to the observing visitor many things which he cannot see elsewhere, and much which cannot be seen there will be found in Leipzig, situated near by, with its wealth of literary activities and its treasures, particularly remarkable along the line of my researches.

In the well-equipped Royal Public Library in Dresden, the Royal Public Cabinet of Etchings, and His Majesty the King's very rich private collection of woodcuts, copper engravings, and hand drawings, I was not only able to view the rarest prints and works, but, thanks to the greatly appreciated generosity of their officials, I was also given the most unrestricted access to the entire collection. I express my especial thanks to Director Frenzel for his ready assistance during my examination of the two last-named collections. Director Frenzel not only personally conducted me through these collections, but repeatedly helped me with the expert advice of a connoisseur in art.

The Library of the Medico-Chirurgical Academy, with the administration and enlargement of which I am officially intrusted, laid upon me the duty not only of augmenting it equally in all its branches, but above all of administering it in the spirit of those who had collected it and had so far maintained and increased it. My endeavor, therefore, was, besides keeping up the modern literary collections, to fill in the gaps existing in the collection of the older books through purchases of missing works. These acquisitions served to maintain the collection for practical purposes, and tended to provide a sound basis for historic researches at some later time, a consideration which had never been lost sight of by the preceding administration. This attitude recognized also the main principle of every library administration, viz., not to crowd these collections with transient literature, but rather to enrich them with works of lasting value. The department of anatomic representations had been

particularly well administered by the founder of this library, the Court Physician, Karl Philipp Gessner (deceased 1780), and by my immediate predecessor, Director Burkhard Wilhelm Seiler (deceased 1843), who was a professor of anatomy. Through auctions and similar opportunities, therefore, it was not difficult to attain a certain degree of completeness in this department of the library and to reach a standard which will doubtless always be a welcome inducement to further historic research work.

I could also avail myself most unrestrictedly of that department of the Leipzig University or Pauliner Library to which Professor Johann Karl Gehler (deceased 1813) had bequeathed most of his medical works, a department which was in charge of the late Professor Gustav Kunze, and was, of course, in every way accommodating to science. This admirable man, whom sudden death took from his work and his friends on the thirtieth day of April of this year, showed an especially active interest, a kind and helpful devotion to his former colleague and friend by aiding him with information and advice, and by furnishing him with all the material which the department of earlier medicine contained.

I, myself, had come into the possession of a small collection of old medical works and prints, thanks to a personal interest and to previous historic studies. When the plan for this book had ripened, I added, even though in a limited way, to this collection such material as I could not borrow anywhere. In addition, I was now able to take up again and utilize a number of preliminary historic studies which I had carried on at a more favorable time.

While thus able to work out a great many things, using my own judgment and such resources as I have enumerated, I still found myself in need of expert advice to properly select from this wealth of material. I was well able to pass judgment on the subjects represented, but could not presume to judge these representations equally well as to their artistic merits, since the studies of works of the graphic and plastic arts, which I had made from merely aesthetic motives, were not by any means adequate for the needs of the occasion. I did not hesitate to obtain information and instruction from artists well versed in the subject and from experienced amateurs. I am especially grateful to my publisher, Mr. Rudolph Weigel, whose expert advice and ready assistance in procuring for me rare and important works, and whose splendid issue of my book furthered my undertaking in a way that was only possible through his rare insight into the history of the graphic arts and to his well-established and extensive trade in works of art, to which he was

personally devoted. He himself had come to love my enterprise and was interested in it in a most unselfish way.

The publisher, furthermore, provided many of the different chapters with illustrations which will doubtless be appreciated as valuable supplements. Their purpose is to present, more vividly than could words, the characteristics of certain anatomists and entire epochs. Although a reduction from the original size was necessary in most cases, it has nevertheless been attempted to reproduce them as faithfully as possible as to subject and style. Most of these illustrations were taken from rare and almost inaccessible prints, and will certainly help to give an indisputable value to this book. In these illustrations, moreover, the two lines of consideration (scientific and artistic anatomy) have been followed. One will readily excuse the fact that the latter has been given the preference, if he considers that the book is primarily devoted to the graphic arts. The reader will undoubtedly also approve of the few vignettes which, although they may have nothing to do with anatomy, are certainly not foreign to the historic-artistic character of the book.

There still remains the pleasant duty of expressing my thanks to the well-known typographer for the tasteful and careful way in which he carried out his difficult task, and for the readiness with which he met my wishes and my desire for accuracy, especially considering the difficulties which the distance of the printing plant imposed.

I also acknowledge my thanks to the artists whose beautiful reproductions of the illustrations used in this book aided essentially in furthering my plans. They are the wood engravers, I. G. Flegel, E. Kretschmar, and H. Krüger, of Leipzig, H. Bürkner and F. Reusche, of Dresden, C. Zimmermann, of Munich, the painter, F. Frenzel, and the chromolithographer and (book) printer, Theodor Meinhold, of Dresden.

May this book, which has served me as a recreation and refreshment in the midst of quite heterogeneous and often pressing official duties, appeal also to others as a welcome contribution to the history of anatomy and the graphic and plastic arts. May it likewise give to the study of anatomic representation, now on the way to a higher perfection, such enlightenment as every science or art may expect from a retrospective view of its earliest periods, which is certain to be found if honestly sought.

L. CHOULANT

DRESDEN
September 15, 1851

TRANSLATOR'S PREFACE

The *History and Bibliography of Anatomic Illustration in Its Relation to Anatomic Science and the Graphic Arts*, which is here offered to students of medical history and bibliography, is a translation of Ludwig Choulant's *Geschichte und Bibliographie der anatomischen Abbildung nach ihrer Beziehung auf anatomische Wissenschaft und bildende Kunst*, published at Leipzig in 1852, which has deservedly attained an authoritative place in medical literature. The book has been out of print for many years, and due to the increasing interest in the subject this translation with additions was undertaken.

The justification for the book's existence must, however, be looked for, not in the Preface, but in the book itself. Since Choulant published his original work, vast stores of new knowledge have become available. The works of writers such as Johann Hermann Baas, Julius Pagel, Max Neuburger, Robert von Töply, Eugen Holländer, Karl Sudhoff, Fielding H. Garrison, Charles Singer, Ernest Wickersheimer, Fritz Weindler, Sir William Osler, Sir Clifford Allbutt, and many more, which throw light directly or incidentally on the history of medicine and anatomic illustration, have, for the most part, appeared since then.

While all have contributed something to the subject, no one since Choulant has written more effectively upon anatomic illustration than Professor Karl Sudhoff, of the *Institut für Geschichte der Medizin*, at Leipzig. It was hoped that he would contribute the section on medieval anatomic MS illustrations, but on account of the war, this was found to be impossible. The section nevertheless has been based on his highly original researches which have been published at various times in the *Archiv für Geschichte der Medizin* and in the *Studien zur Geschichte der Medizin*. For this valuable information and the illustrations, the translator desires to express his deep obligations and grateful acknowledgments to Professor Sudhoff.

The original text has been supplemented and corrected by the notes of Choulant in the *Archiv für die zeichnenden Künste*, Leipzig, 1857, which were no doubt intended to have been used by him for a second edition. The whole of the translation has therefore been carefully revised and, in many cases, rewritten or rearranged. The additions inserted by the translator are generally distinguished as notes at the

foot of the pages. It is hoped that these additions may serve to increase the usefulness of the book and every endeavor has been made to bring the subject up to date. In the absence of an opportunity to verify the titles of the works quoted by Choulant, the *Index-Catalogue* of the Library of the Surgeon General's Office, United States Army, was consulted. Where minor errors in transcription were discovered, such discrepancies were corrected.

The translations of the various Latin, Spanish, and Italian passages, it is hoped, will aid in the reading of the text.

A word regarding the illustrations may not be out of place here. When the original work was published the modern processes of reproduction were not yet invented, and the illustrations were cut on wood (Author's Preface, p. xiv). In spite of this, the method preserves with far greater faithfulness the spirit and effect of the original plates than a direct photograph. A photographic copy from an original print suffers from mutilation by library stamps and writing, by discoloration of the paper, by foxing and frequent handling and by folding. To attain a more perfect plate than could be obtained directly from the old editions, photo-engravings were made directly from the facsimiles in Choulant, with but few exceptions. Some new illustrations have been inserted, but as a whole they represent those in the original work.

A biography and portrait of Choulant, with comments on a selected list of his writings, have been added, and lastly a copious index has been supplied, which it is hoped will make the work still further useful as a book of reference. The material for the biography of Choulant has been taken largely from the memorial address by F. P. Gleisberg, *Ludwig Choulant und die Reformbestrebungen in der Medicin im Königreich Sachsen*, in the *Deutsche Klinik*, Berlin, 1865, xvii, 365 *et seq.*

The translation was done during spare moments and from the commencement of the work it was felt that help must be sought on special points, as the task was one which no man could satisfactorily accomplish from his own resources. Such application was not made in vain. To none am I more indebted than to my good friend Dr. Fielding H. Garrison, principal assistant librarian of the Surgeon General's Library, Washington, D.C., for his generous assistance, his constant interest in the work, for his courteous communication of valuable notes not easily accessible, and for his thorough scholarship and ripe judgment to which I have deferred in many instances. Especial thanks are also due to Mr. and Mrs. Augustus Dillon (Chicago), for their kindness in helping to straighten out many difficult situations; to Mr. Felix Neumann,

bibliographer of the Surgeon General's Library, for untiring consideration in the communication of his ample stores of knowledge, and of books; to Lieutenant Colonel C. C. McCulloch, Jr., Medical Corps, United States Army, librarian of the Surgeon General's Library, for his generous loan of books; to Dr. C. W. Andrews, librarian of the John Crerar Library, Chicago, for similar courtesies extended; and to Dr. Louis J. Mitchell (Chicago) and to Walter M. Hill (Chicago) for many valuable suggestions.

In concluding this preface and taking leave of Choulant, the companion of many pleasant and some laborious hours, it is to be hoped that this work may stimulate, so far as its limits extend, an interest in one phase of medical history.

M. F.

CHICAGO, 1917

MEMORIAL NOTICE: MORTIMER FRANK (1874–1919)

In the death of Dr. Mortimer Frank, at Chicago, on April 21, 1919, at the early age of forty-four, the cause of medical history in this country loses one of its most promising and active adherents. Dr. Frank was born in Buffalo, N.Y., on May 26, 1874, and after the usual schooling in Chicago, graduated in engineering with the degree of B.S. at the Massachusetts Institute of Technology (1897). During the next two years he was engaged as a civil engineer on the Cleveland, Cincinnati, Chicago, and St. Louis Railroad. Subsequently taking up the study of medicine, he received his degree from the medical department of the University of Illinois in 1901. After taking postgraduate courses in Philadelphia and New York, he commenced practice in Chicago, and soon became well known as a skilful and sagacious specialist in eye diseases and eye surgery. As the local newspapers record, he had the enviable record of having never once turned away a patient who was unable to pay for treatment. He was ophthalmologist to the Michael Reese and other hospitals, and a member of various local and national medical societies. To his subject he contributed a number of good papers, notably those on congenital sincipital encephalocele (1903), color perception in relation to distant signal lights (1904), the eye symptoms in myasthenia gravis (1905), rachitic erosions of the teeth in lamellar cataract (with I. A. Abt), and the schematic eye (1919). To Dr. Casey Wood's *System of Ophthalmic Operations* (1911, I, 17–41), he contributed a valuable illustrated historical article on representative eye surgeons.

In 1905, Dr. Frank turned his attention to the history of medicine and produced in succession, a series of excellent papers on the charlatan oculists, John Taylor (1905) and Sir William Read (1905), the Resurrectionists (1907), Philip Syng Physick (1911), Caricature in Medicine (1912), Medical Instruction in the Seventeenth Century (1915), Tagliacozzi (1916), the Discovery of the Secretory Glands, read before the Medical History Clubs of the Johns Hopkins and Harvard universities (1916), and the above-mentioned paper on the Schematic Eye, contributed to the Osler Anniversary Volumes (1919).

In 1915, he became Secretary of the Chicago Society of Medical History, and editor of its *Bulletin*, which owes much of its improvement

in format and subject-matter to his enterprise and good judgment. In the same year, he published at his own expense an elegant reprint of Henry Morley's *Anatomy in Long Clothes*, for the Vesalian quadricentennial (1915). Dr. Frank was elected a member of the German Medical History Society (Leipzig) in 1916. At the June meeting of the American Medical Association in 1918, he gave an exhibit of early medical books from his private library, with a printed *catalogue raisonné*. In addition to outdoor sports, fishing, and gardening, his personal tastes were in the direction of collecting rare medical books, fine bindings, and medical engravings, and from these, he made many generous donations to the Surgeon General's Library, which have been acknowledged in its Index Catalogue. In the last years of his life, Dr. Frank, through his exceptional *flair* and knowledge, acquired a choice and valuable collection of medical rarities, which went, after his death, to the University of Chicago and the Surgeon General's Library.

I first met Dr. Frank when he visited Washington in the summer of 1915, in company with Mr. Hoeber, and was struck at once with his refined manner, his clear intelligence, and his easy familiarity with the source and reference books of medical history. Some time after, he announced his intention of translating Choulant's *History and Bibliography of Anatomic Illustration*, which he completed in two years' time. In this task, he learned to know what hard work means. His performance, which included a large amount of original research, is in every way creditable. There was a genuine need for such a translation, since the original text, one of the classics of medical history, a *vade mecum* for anatomists, artists, and medical librarians, has been long since out of print. The publication of this history in 1852 was an affair of the right "psychological moment," in the true and false meanings of the term; the circumstances which impelled Choulant to assemble his material, to shape it, and to publish it about the middle of his century, were equally fortunate. After this time, anatomical illustration by means of free-hand drawings was superseded by photography, lithography, and other reproductive processes, and was further neglected through the growth of histology, morphology, and embryology. Students now learn their anatomy by dissecting. Artists, who once, as Streeter has shown, outpaced the doctors in the dissection and delineation of anatomical structures, now copy directly from the nude body or the photograph. The merits of Choulant's book, then, are of a unique order. It is a key to the comprehension of the older illustrated writings upon which the modern science of anatomy is based. The prosy, sesquipe-

dalian, sometimes obscure sentences of the original, have been vivified and clarified in Frank's translation, by bisection, dissection, and simplification, without any loss of the original meaning; the text has been enlarged by additional chapters, including a clear and exhaustive account of Sudhoff's researches on the MS illustrations of the Middle Ages; the bibliographies have been extended and improved. When Choulant began his studies for this work, he had nothing to go on, beyond the scattered original texts, Haller's *Bibliotheca Anatomica*, Hain's list of incunabula, a few art catalogues, and the brief observations of William Hunter and Blumenbach on the hand drawings of Leonardo da Vinci. His work is a monument of original research, not to be duplicated, a definite source book for the future, as well as for the present and the past. Frank's version converts it into a viable and readable modern book.

In person, Dr. Frank was a man of highly attractive and friendly character, generous, sportsman-like, of unfailing good nature, and with the well-born gentleman's innate delicacy and sure intelligence, which wins esteem by respecting the personal rights and private feelings of others. His loss will be keenly felt by all whom he counted as friends.

F. H. Garrison

ABBREVIATIONS OF AUTHORITIES CITED

Haller: von Haller (Albrecht): *Bibliotheca anatomica*, Zurich, 1774–77, 4°.

Moehsen, Bildn: Moehsen (Johann Karl Wilhelm): *Verzeichniss einer Sammlung von Bildnissen grösstentheils berühmter Aerzte;* with vignettes, Berlin, 1771, 4°.

Moehsen, Medaill.-Samml.: Beschreibung einer Berlinischen Medaillen-Sammlung, die vorzüglich aus Gedächtniss-Münzen berühmter Aerzte bestehet, with copper-plates, 2 vols., Berlin and Leipzig, 1773, 1781, 4°. The second volume also bears the title *Geschichte der Wissenschaften in der Mark Brandenburg, besonders der Arzneiwissenschaft.*

Blumenbach, Introd.: Blumenbach (Johann Friedrich): *Introductio in historiam medicinae litterariam*, Göttingen, 1786, 8°.

Panzer: Panzer (Georg Wolfgang): *Annales typographici ab artis inventae origine ad annum 1536, post Maittairii, Denisii, aliorumque curas in ordinem redacti et aucti*, 11 vols., Nuremberg, 1793–1803, 4°.

Hain: Hain (Ludwig): *Repertorium bibliographicum, in quo libri omnes ab arte typographica inventa usque ad annum MD. typis expressi ordine alphabetico vel simpliciter enumerantur vel adcuratius recensentur*, 2 vols. in 4, Stuttgart and Tübingen, 1826–38, 8°.

Ebert: Ebert (Friedrich Adolph): *Allgemeines bibliographisches Lexikon*, 2 vols., Leipzig, 1821, 1830, 4°.

Weigel: Weigel (Rudolph): *Kunstkatalog*, I, Parts 1–7, 1834–38; II, Parts 8–14, 1840–43; III, Parts 15–21, 1844–50; IV, Parts 22–28, 1850–57; V, Parts 29–35, 1859–66, Leipzig, 8°.

Cicogn.: Cicognara (Leopoldo): *Catalogo ragionato dei libri d'arte e d'antichità*, 2 vols., Pisa, 1821, 8°.

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LIFE OF JOHANN LUDWIG CHOULANT

Die Geschichte einer Wissenschaft ist der Hort ihrer Freiheit; sie duldet ihr keine einseitige Beherrschung.

"The history of a science is the palladium of its freedom; it prevents it from being tyrannized over by narrow, bigoted viewpoints."

(*Motto which appeared with lithographed portrait, in 1842.*)

In the first half of the nineteenth century, there arose a group of medical scholars in France, Germany, Italy, and England, whose achievement was equaled only by those of Sprengel, Moehsen, Blumenbach, Gruner, and others in the eighteenth century, and has been surpassed only by the work of the present Leipzig and Vienna schools. The great names of Littré, Daremberg and Chéreau, Hecker, Haeser, Wunderlich, Hirsch, Marx and Steinschneider, De Renzi and Puccinotti, Adams and Greenhill, need no encomium and tell their own story to those who follow medical history.

In this brilliant group, there is assuredly no name deserving of a higher place than that of Johann Ludwig Choulant, the historian of anatomic illustrations; yet, through some strange caprice of fate, his name and fame have been very inadequately commemorated and no good biography of him has been written to date, although his services to the kingdom of Saxony as a medical reformer and jurisconsult have received their due meed of praise. One reason for this is perhaps to be sought in the fact that the few medico-historical journals founded in Choulant's day were, as usual, short-lived, "Ephemeridae" in the true natural-history sense, and none of them covered more than two or three volumes.

Choulant was not only one of the greatest of medical bibliographers and historians, but was, like Haeser, Baas, and Sudhoff, an active practitioner and hygienist, the author of a work on internal medicine (1831), which passed through six editions and was translated; an authority on anthropology and craniology; and an expert in forensic medicine and medical polity, in which fields he rendered many learned and valuable reports.

A native of Dresden, Saxony, he was born November 12, 1791, son of the master cook Choulant, in the service of the prince, later King Antony of Saxony. His first instruction was received in the Catholic school at Dresden and after finishing there, he went to the so-called Catholic *Gymnasium* connected with it, whose chief aim was to prepare its pupils for admission to the Wendish Seminary at Prague, where the native Catholic priests are trained. Here the first foundations were laid for his later brilliant and remarkable philologic faculties. What circumstances caused him to drop his classic studies for the time being and in 1807 to enter the Royal Pharmacy of Dresden as an apprentice, one is unable to learn.

This temporary interruption of his studies was not without influence upon his later practical activities. Choulant would surely not have become such a skilful and successful therapeutist as he indeed was, if he had not at this early stage familiarized himself so thoroughly with the nature and the methods of preparation of medicines and with their most practicable combinations. But for the awakening genius of a Choulant, pill-mongering was not a satisfying occupation for any length of time. Although the involuntary leisure hours during the stay in such a pharmacy offered him abundant opportunities to render himself practically familiar with the natural sciences, he nevertheless had to regard this vocation as missing his proper calling. Every free hour was therefore utilized to get out the old classics, and often the slow drug clerk was reprimanded because he lingered too long in the cellar of the pharmacy memorizing most diligently the verses of Horace and Ovid. We should therefore not wonder that Choulant, in 1811, gave up this depressing occupation, in which he had remained four whole years, and entered the Medico-Chirurgical Academy at Neustadt (Dresden).

Here, under the guidance of Hedenus, Kreysig, and Ohle, he began his medical career which lasted exactly half a century. In the four semesters at this institution, during which he occupied himself most diligently with anatomy, he also completed his classical studies and was thus able, in 1813, to matriculate in the medical department of the University of Leipzig, where the philosophic genius of Ernst Platner exercised an especially significant influence upon his further mental development.

He passed his examination on April 12, 1817, and on March 18, 1818, graduated at Leipzig with a memorable dissertation on ten specimens of spinal deformity (*Decas pelvium spinarumque deformatarum*), to which he added another decade (*Decas secunda*) in 1820.

Owing to his slight and almost insignificant appearance, which was not very promising for private practice, he decided to try and acquire the right to hold academical lectures at the University of Leipzig. His petition was rejected with the explanation that the time was still distant when Catholic lecturers would be admitted to the thoroughly Protestant University of Leipzig. This act of religious intolerance left a profound and indelible impression upon Choulant, whose mind had never known proselytism, who anxiously avoided touching upon the relations of creed to science, and for whose great, tolerant genius all religions had probably a philosophic and historic significance.

In these hours of severe trial, like the dawn of a new era of his life, Pierer's summons to Altenburg reached him. Johann Friedrich Pierer, in some way, had learned of this growing genius and called upon the young scholar to collaborate with him as assistant editor in the publication of his *Realwörterbuch* (1816–29). He responded to this call in 1817, and, under Pierer's guidance, Choulant, although a young and little occupied practitioner, developed an extraordinary literary activity, consisting partly in the production of a number of independent articles in the *Realwörterbuch* and partly in the collaboration (1821–24) on the *Allgemeine medicinische Annalen des neunzehnten Jahrhunderts.* With all this literary work, he found time for his private practice. His activity in Altenburg lasted until 1821. This period was not without deprivations, as appears at least from the fact that Choulant was without means. As he expressed himself to several friends and students, he knew of nothing sadder and more miserable than a literary activity founded on medicine only. But through it all he had made himself known as a gifted physician, and he probably owed it primarily to this good reputation that, in 1821, he received an appointment as a physician to the Royal Infirmary at Friedrichstadt (Dresden).

However limited the material at Choulant's disposal, only twelve beds, yet it kept him in practical life and prevented him from becoming a bookworm. Besides, his position soon furnished him an extensive private practice in Dresden. This, although not always profitable, he undertook with rare devotion and unselfishness. During this period of his life he became acquainted with his future wife, whom he met at the bedside of her invalid father. They were married in 1822 and had three children. Soon after, the real field of his activities in Dresden disclosed itself, although from an altogether different aspect.

Upon returning from his captivity, King Frederick August I of Saxony, on the advice of his government, decided upon the rehabilitation

of the Neustadt Medico-Chirurgical Academy and, in 1816, the Academy was opened at Dresden under most favorable auspices, with men like Seiler, Kreysig, Ohle, and Ficinus on the faculty. As early as 1822 we find Choulant at the Academy lecturing on medical practice, and, in 1823, he became professor of theoretical medicine and director of the clinic. At that time also, he became assistant editor of the Dresden *Zeitschrift für Natur- und Heilkunde.*

In 1833, he received the position of Medical Assessor on the District Board in Dresden, an office which laid the foundation for his remarkable achievements in legal medicine.

Attacks had been made upon the Academy by the faculty of the University of Leipzig, charging the lack of classical preparation of the students. The public recognition which was paid the pupils of the Academy, especially at the different state legislatures, was in open contradiction to these charges, frequently emanating from the Leipzig faculty. These charges were disproved by Choulant in 1833 in a memoir written for that purpose, viz., *Zweite Erörterung der Verhältnisse der chirurgisch-medicinischen Academie in Dresden zu dem Medicinalwesen des Königreichs Sachsen.* This was given a great deal of notice even among his opponents. He attempted to invalidate these charges by calling attention to the fact that the Academy, although it admitted high-school pupils, nevertheless saw to it that its students continued their linguistic and mathematical studies all through the course. The consequence of this had been that the University of Leipzig, as well as the other universities, had never refused to admit any aspirant for the degree of medicine who had received his training at the Dresden institution.

In 1836, he became Royal Saxon Councilor (*Königlich Sächsischer Hofrath*), and in 1838 a great distinction was bestowed upon him when he accompanied Prince John, later King, on a journey to Italy as physician and scientific adviser. In 1856, he had the honor, as director, of greeting King John in the Academy.

In 1843 he succeeded Burkhard Wilhelm Seiler as director of the Academy, which gave him full control of the Academic Library. Choulant became the second and last director of the Academy, as the position was not filled again after his death.

He gave up his position of Medical Assessor in 1844 for the newly created office of Medical Referee to the Ministry of the Interior, and became Royal Saxon Privy Medical Councilor (*Königl. Sächs. Geh. Medicinalrath*). In this capacity, as stated, he served the Saxon kingdom in the advancement of medical education and as an expert in

medical jurisprudence. At the same time he continued his bedside teaching, but gave up his lectures on practice to Hermann Eberhard Richter.

Choulant's active life during the period of 1816–60, when he retired from the Academy, after thirty-eight years of work, may best be summed up by a brief reference to and comment on his more important writings published during this epoch.

One of the characteristics of Choulant was his ambition to impart to others all that he had acquired and had recognized as of value to science, and to preserve it for posterity. He was possessed with this ambition because of his preliminary studies and his enthusiasm for the philosophic and aesthetic aspects of science, regardless of its material significance to him as a means of gaining a livelihood.

Through his numerous historical writings, all models of completeness and reliability, Choulant contributed in such a measure to the advance of the knowledge of medical history that his name will remain forever among its highest names.

. His earlier literary labors consisted mainly in translations from English medicine. Thus, in 1816, for his baccalaureate address in medicine, he translated John Ford Davis on endocarditis (1808), and at the same time William Charles Wells's essay on rheumatic endocarditis (1812), the first essay ever written on this theme. In 1817 followed A. Duncan's observation on phthisis, and in 1818, a translation of the *Essay on the Nature of Scrofula* by Carmichael, Henning, and Goodlad. In 1819 appeared his essay "On Prolixity in Medical Literature" (*Über die Vielschreiberei in der Medicin*).

In 1821 he published jointly with Karl Friedrich Haase and Friedrich Ludwig Meissner, of Leipzig, and Moritz Küstner, of the Breslau School of Obstetrics, "Contributions to Obstetrics" (*Bereicherungen für die Geburtshülfe*).

In 1822, he published his medical chronology (*Tafeln zur Geschichte der Medicin*), an excellent tabular arrangement, constituting an easy introduction to the study of the history of medicine. It begins with the earliest times and concludes with the eighteenth century. The work comprises twelve plates, of which the first and last deal with the entire field of medicine while the other ten are devoted to separate phases of it. Each of these plates is preceded by a general history of the special subject it deals with, to which is added an independent fixation of the epochs as taken from the particular history of this theme. The individual plate represents the history of a subject ethnographically and synchronistically, mentioning also the more prominent and influential

men with the year of their prime or with the date of the first appearance of their important work on the topic in question. Each separate plate is followed by the history of the literature of the special subject it deals with, and at the conclusion of the work is given, more completely and more accurately, the general history of the literature of medicine.

The versatility of Choulant is shown by the fact that in 1823 he composed and published anonymously an opera entitled *Libussa, Herzogin von Böhmen.*

He translated, in 1823, *Il medico giovane* by Luigi Angeli, of Imola, under the title "The Young Physician at the Bedside" (*Der junge Arzt am Krankenbette*). This was later translated into Dutch by Anthonius Moll.

In 1823, he gives evidence of an extraordinary knowledge of Pompeian medicine in a paper *De locis Pompejanis ad rem medicam facientibus*, dealing with the instruments and other medical objects excavated there. Besides, he gives a plan of Pompeii based on the excavations at that time. This learned discourse was given on December 15, 1823, on assuming his professorial chair.

He edited, in 1824, Ernst Platner's "Questions in Forensic Medicine" (*Quaestiones medicinae forensis*), with a life of Platner.

In 1824, he published his prolegomena to a new edition of Celsus (*Prodromus novae editionis Auli Cornelii Celsi librorum octo de medicina*). This edition is probably the most learned and valuable bibliographical schema ever prepared of the many editions of this writer. Celsus was Choulant's favorite author and was of inestimable benefit to him on account of the practical usefulness of his theories. He took pleasure in giving to every medical student who left the University one of Celsus' sayings. None of the older medical writers was quoted more frequently by Choulant than Celsus. In the same year, he also published an essay on Asclepiades of Bithynia.

In 1825, came the first edition of his "Introduction to Prescription Writing" (*Anleitung zur ärztlichen Receptirkunst*), an invaluable little formulary in its day, containing the most approved medical preparations, and written in Choulant's clear and comprehensible style. A second edition was published in 1834.

He also published, in 1825, a biography of his former teacher, the physicist Wilhelm Gilbert, whose amanuensis Choulant had been for one year during his college term.

In 1826, he edited the three *Carmina* of Gilles de Corbeil (*Aegidius Corboliensis*) on urine, pulse, and the virtues and praises of compounded

drugs. The last a series of 4,663 hexameters on 80 drugs, designed as a versified paraphrase of the glosses of Matthaeus Platearius on the celebrated formulary (*Antidotarium minus*) of Nicolaus Salernitanus, who, as Wickersheimer has shown, has been often confused (as "Nicolaus Praepositus") with the French physician Nicole Prévost.

In 1828, appeared the first edition of his "Bibliographical Handbook of Ancient Medicine" (*Handbuch der Bücherkunde für die ältere Medicin*). A second edition was published in 1842. This *Handbuch* is a testimony to German industry and knowledge of languages. It is the greatest of his bibliographical works. The second edition has been for nearly a century the medical librarian's *vade mecum* and is absolutely indispensable for the study of the Greek, Latin, and Arabic texts of medicine. It is only equaled by Hain's *Catalogue of Incunabula;* indeed it is, in effect, a catalogue of all the medical incunabula known to Choulant. On account of the extreme scarcity and prohibitive price at the hands of antiquarians, an anastatic reproduction was made in 1911, and this too is rapidly becoming *introuvable.*

In 1828, Choulant published a pocket *Anthropologie;* in 1829, a biographical essay on Jenner; and in 1830, he issued his vest-pocket edition of Fracastorius' poem on syphilis (1530), a much-prized curio. In the same year, he also published an introduction to Friedrich Holl's work on petrefacts, dealing with prehistory of organic terrestrial remains. A second edition was published in 1843.

In 1831, he published his "Modest Wishes for a Future Medical Code for the Kingdom of Saxony" (*Bescheidene Wünsche für eine künftige Medicinalordnung des Königreichs Sachsens*), and edited a three-volume edition of Stahl's *Theoria medica vera.*

In 1831 to 1833, he edited Stahl's *Theorie mehrerer älteren Aerzte,* and from 1833 to 1835, the autobiography and writings of Benvenuto Cellini (*Opere di Benvenuto Cellini*), which he dedicated to Carl Gustav Carus.

In 1831, was published his textbook on practice (*Lehrbuch der speciellen Pathologie und Therapie des Menschen*). This is the first edition of his *Lehrbuch* of practice, long used as a textbook in many universities. The usefulness of the work is evident from the five editions that followed in 1834, 1838, 1848, 1853, and 1861. The edition of 1838 was the last one with which Choulant personally had any connection. Hermann Richter published the last three editions, and, in 1853, the work had been so altered by Richter as to conform to the latest scientific advances.

In 1832, he edited the twelfth-century poem *De viribus sive de naturis herbarum*, attributed to Odo of Meudon (*Odo Magdunensis*), in possession of the Royal Public Library at Dresden. It comprises 2,269 hexameters on 77 plants, based upon material derived from pseudo-Pliny, Gargilius, pseudo-Dioscorides, and Constantinus Africanus, and was itself attributed to a pseudo-author, "Macer Floridus," under which name Choulant published it.

In 1833 was published a festal program on the King's Evil which the *Gesellschaft für Natur- und Heilkunde* in Dresden printed in honor of the anniversary of its member, the Royal Physician Hedenus.

In 1834 appeared three anthropological contributions on the natural cycles of cultural history, the natural history of man and human sensation.

Choulant compiled and edited, in 1834, a new collection of Royal Saxon medical laws from the time of the pest ordinance of 1680. A second edition appeared in 1844.

In 1835 appeared his essay on "Voluntary Motion in Man" (*Die willkürliche Bewegung des Menschen*), and, in 1836, he edited Claude Quillet's *Callipaedia*, on the art of begetting beautiful children.

In 1836, followed his "Introduction to Medical Practice" (*Anleitung zur ärztlichen Praxis*), which had been preceded seven years previously (1829) by his "Introduction to the Study of Medicine" (*Anleitung zu dem Studium der Medicin*). In the latter, he had addressed the student, while in the former he now appealed to the mature physician.

In 1838 to 1840, he edited the *Historisch-literarisches Jahrbuch für die deutsche Medicin*, a tiny medico-historical periodical which was entirely written by Choulant. This shows his remarkable predilection for pocket-size formats. In the same year, he helped Callisen with his *Medicinisches Schriftsteller-Lexikon*.

In 1840, he published a historical paper on "Animal Magnetism" (Royal Touch) (*Über den animalischen Magnetismus*), and, in 1842, the second edition appeared.

In 1841, he sketched out a law on the practice of animal magnetism, at the request of the Ministry of the Interior. The law was passed on August 4, 1841. The same year (1841) he published a paper on "The Women of Salerno" (*Die Weiber von Salerno*) in Haeser's *Archiv für die gesammte Medicin*.

In 1842, his *Bibliotheca medico-historica* appeared, one of the most important of bibliographies and with the *Additamenta ad . . . . bibliothecam medico-historicam*, 8°, Halis, Sax., 1842, of Julius Rosenbaum,

of great importance to research workers. In Sudhoff's estimation, this latter is as weighty and valuable as the Thierfelder *Additamenta* to Haeser's great bibliography of epidemic diseases.

In 1843 was published his essay on anatomical illustration in the fifteenth and sixteenth centuries (*Die anatomischen Abbildungen des XV und XVI Jahrhunderts*). This was written as a memorial address for the celebration of the twenty-fifth anniversary of the *Gesellschaft für Natur- und Heilkunde* at Dresden, founded September 19, 1818. It was a forerunner of his great history of ten years later (1852), just as his *Prodromus* on Celsus was a precursor of his *Handbuch der Bücherkunde*.

In 1844, the faculties of the Academy and the affiliated School of Veterinary Medicine published a memoir of the founder and the first director of the Academy, Burkhard Wilhelm Seiler, who had died in 1843. Choulant was essentially the author of this report, although it was supposed to be a joint production of his colleagues.

In 1844, appeared his treatise on cranioscopy (*Vorlesungen über Kranioscopie oder Schädellehre*), with a bibliography from the time of Gall.

In 1845, was published "The Bath-Guest at Franzensbad" (*Der Curgast in Franzensbad*), which contains instructions on the use of this mineral bath and the mode of living required there. In 1851, a second edition appeared.

In 1846, Choulant published an essay on Albertus Magnus in the first year's issue of Henschel's *Janus* and, in 1847, his report on the mineral spring Augustusbad.

In 1847, were also published his expert reports on medical jurisprudence which were made in the name of the Medico-Chirurgical Academy at the request of the justices of the Court of Appeals. The diction as well as the manner of presentation are distinguished by clarity and precision and are certainly unexcelled. The choice of the cases is most fortunate. They refer to questions of poisoning, doubtful mental responsibility, drunkenness, pyromania, as well as to doubtful paternity and maternity.

In 1848, the twenty-fifth jubilee of his professoriate, he published a paper on "The Mineral Springs of Wolkenstein" (*Die Heilquellen von Wolkenstein*).

In 1850, by order of the Ministry of the Interior, he drew up instructions on burial *in re* premature burial.

In 1852 appeared his great work, the *Geschichte und Bibliographie der anatomischen Abbildung nach ihrer Beziehung auf anatomische Wissenschaft und bildende Kunst.* In this important work the anatomic

illustrations of the fifteenth and sixteenth centuries are again particularly made the object of discussion. He had treated of them before in the memorial treatise of the *Gesellschaft für Natur- und Heilkunde* for the year 1843. This work is certainly only approached by Karl Sudhoff's monographs in the later period, and, on its own ground, is still unsurpassed.

In 1855–59, he published in the *Archiv für die zeichnenden Künste*, a series of papers on anatomical and botanical illustration. These comprise articles on the manuscripts of Dioscorides with illustrations (1855); the application of woodcuts to pictorial representation of plants, etc. (1855); on the participation of important artists in anatomical illustration (1856); on miniatures in a medical manuscript found in Dresden (1856); on botanical and anatomical illustrations in the Middle Ages (1857); also his important additions and corrections to his *History of Anatomic Illustration* (1852); on *Apulejus de herbarum virtutibus* (1859); and a final article on an anatomical plate by Peter de Wale (1859).

In 1859, Choulant published his last paper, a report on a case of criminal abortion, in Johann Ludwig Casper's "Journal of Forensic Medicine" (*Vierteljahresschrift für gerichtliche und öffentliche Medicin*).

German medicine in the first half of the nineteenth century labored under the disadvantage of being split into schools. In consequence, the best minds of the time strayed into devious bypaths conceiving the philosophy of medicine, and such schools as Homeopathy, Hydropathy, Animal Magnetism, Phrenology and a host of others sprang up, and of their offshoots, the Nature-Philosophy School represented the golden age of these systems. Its principal spirit was the naturalist Lorenz Oken, of Bohlsbach in the Bavarian Highlands. Clinical medicine was dominated by Carl Schelling, who became ultimately and exclusively a philosopher. On the side of actual facts, however, the Nature-Philosophy School exercised its greatest service in the physiological teachings of Johannes Müller.

Many important men of science belonged to its fold, and the first to break away from its foolish doctrines was Johann Lucas Schönlein, the founder of modern clinical teaching in Germany, introducing examinations of blood and urine, chemical analysis, auscultation, percussion, and microscopical examinations. From this school sprung also Heinrich Haeser, the famous medical historian, particularly eminent for the history of epidemic diseases. The downfall of the school was brought about by that change in the intellectual bent in the time, which was completed by the Revolution of 1848.

It was the doctrines of the new Vienna School that gave positive medicine its principal center in Germany. Its chief luminaries were Karl Rokitansky and his colleague Josef Skoda, both Bohemians. Rokitansky was a purely pathological anatomist, while Skoda's scientific merit is based upon his interpretation and conception of physico-diagnostic phenomena by adapting them to physical laws, the law of sound. The honor, however, of being one of the first to introduce the Viennese innovations in Germany belongs to Johannes von Oppolzer, who after a residence of seven years in Prague, received a call to Leipzig. He popularized physical and anatomical diagnosis and steered clear of all haphazard theorizing.

The February revolutionary movement of 1848 in Paris spread with rapidity across the Rhine and led to immediate events in Vienna and Berlin. The young students were tremendously affected by these upheavals, which changed the old habits of thought and shook society to its foundations. As everybody shouted for improvements, timely reforms, justification of the great period in which they lived, abolishment of red tape and privileges, it was very natural that the intelligent young student body should join in this chorus with all its might. While the great mass of German students threw themselves into the arm of practical politics, lending word and deed to the political movement, many others demanded, no less aggressively, reforms of all kinds in the university life, e.g., abolishment of compulsory studies and compulsory attendance at lectures, elimination of university courses, etc. It was to be expected that medicine, despite the reluctance toward innovation, should participate in the transformations. In Berlin, the student body harried Johannes Müller, at that time president of the University, in such a way that his friends felt anxious for his mental well-being. Leipzig, too, was astir. The clinical students, at last tired of Clarus' hypotheses and yearning for practical knowledge, agreed to make the most urgent representation to the senate of the University, regarding the impossibility of acquiring any competent knowledge through his teachings. They demanded the honorable discharge of Clarus, then professor of clinical medicine, and the appointment of Hermann Eberhard Richter to the medical faculty. The deputation sent to the faculty with these demands was not particularly well received by the senior of the faculty, Ernst Heinrich Weber, and, in addition to other advice, the answer was given that those students who especially desired to hear Richter had only to depart for Dresden. Another deputation was sent to the Minister of Education, but also returned without any success. This

rebuff was necessarily bound to increase the excitement. The students now gave their word of honor not to enter the clinic again until a new clinical instructor had been elected. There was nothing left for the Senate to do but to intrust Karl Ernst Bock, decidedly the most popular man on the faculty, with the clinical chair, or allow the course to be abolished.

While all these events were developing and happening, the old school and its representatives were violently attacked. The great excitement animating all minds at that time led, quite naturally, to a singular irritability in regard to all of these controversies, which was greatly increased by the fact that both sides believed themselves absolutely right. If the combatant in these polemics had not departed from objective grounds, surely no such unfortunate extravagances as occurred would have been possible. The controversies very soon degenerated into personalities which were not, as one might expect, committed in medical journals, but were published in the daily press and in pamphlets. Thus the public was called upon to be the judge, and one cannot deny that the instances laid before them were generally so striking and so convincing that very soon this new doctrine had gained many friends and admirers among the laity.

In the beginning of 1848, Choulant attained the zenith of his fame. Up to this time no one had opposed his increasing reputation, for the previously mentioned attacks were made not against him, but against the institution with which he was connected. Nobody had as yet dared to attack seriously or to question his authority. But as he refused to adjust himself to the more and more victorious scientific advances, he was, from now on, the target of many animosities. The personal attacks that were now made upon Choulant were sometimes very severe and not infrequently absolutely unjust. Some were even so inconsiderate as to advise him either to give up his position or to take up his studies anew in Prague or Vienna.

During all this time, the student body of the University of Leipzig had not remained inactive. It had at last compelled the Minister of Education to summon Johannes von Oppolzer, whose stay in Prague had become unbearable owing to the activities of the Bohemians, as a clinical instructor to the University of Leipzig. No more fortunate selection could have been made, and the University now possessed a man who was fully equipped with all that was needed to win and fire the youthful student for the new theories.

It was, first of all, Oppolzer's human attitude, his almost comrade-like intercourse with the students, that won him and assured him the

affection of his pupils. Choulant, on the other hand, held his students in anxiety and terror to obtain their admiration and respect, but by doing so did not win their affection. The fact that Oppolzer, Rokitansky, Reinhard, Jaksch, and Richter did not antagonize the intelligent part of the growing generation, helped in no small degree to make them famous. They understood how to win and hold permanently the affection of the young student through a human devotion to them that was devoid of any semblance of artificiality. The intelligent youths, in due gratitude, carried their fame into all parts of the world, and it is certain that, had any one of them been made the subject of such attacks as were made upon Choulant, they would have risen and stood up for him. But not one voice was raised among Choulant's former pupils at the time of the attacks made upon him.

Choulant, one would think, was now doubly obliged to declare himself in favor of the new doctrines, as they had proved universally efficient, and as the government, through the appointment of Oppolzer, had positively declared itself for them. On the contrary, he now became an outspoken opponent, where before he had merely shown indifference, and he combated them with all the means at his disposal, with a sarcastic criticism that only too frequently degenerated into bitter scorn. He could not rid himself of the notion that modern medicine was nothing but a one-sided treatment of the matter, devoid of any inner justification owing to this one-sidedness, and therefore bound, sooner or later, to disappear again from the great arena. He refused to perceive that the question was not merely the introduction of novelties but a formal modification of medical science, putting at last the facts themselves in place of ideal theories, empty phrases, and abstractions that had no corresponding realities. He could not conceive that the method employed up to now at the bedside and in scientific pathology, was fundamentally wrong, and that these reform movements meant nothing less than the final introduction of true inductive principles in medicine. Perhaps in accordance with his own words, "The history of a science is the palladium of its freedom; it prevents it from being tyrannized over by narrow, bigoted viewpoints," Choulant appeared to join the rather large number of older physicians who knew nothing of modern medicine but the stethoscope and plexímeter.

In the light of the history of medicine and the successive changes of systems in the course of centuries, he thought that the time was not far distant when these much-hated tools of fashion, "trombone and anvil," as he called them, would disappear again from practice and be handed

over to the history of the science. He therefore preferred to question the patient, whom he examined for hours, rather than to find out for himself, by means of simple manipulations, the physical condition of important viscera. He scouted the idea of making an anatomic diagnosis at the bedside. Common phrases of Choulant were, "Do not talk of things that you cannot see," or, "You are speaking of pathologic changes which we are able to find postmortem, but to this the patient does not care to be brought." He persisted in the old style of summarily compiling the symptoms by questioning and by means of an examination of the patient, and then comparing them with the picture of the disease, the *species morbi*, by way of a conclusion. In doing so this great genius had lost sight of the fact that to adjust the insufficiently conceived concrete, willy-nilly, to an abstract ideal, really meant a *salto mortale*. He had not taken into account that these sorts of conclusions were mere analogies—and how deceiving they are, especially at the bedside! How utterly different are the conditions of internal disease, based on an almost complete identity of external symptoms! In these facts lay the weakness of the symptomatologic school to which Choulant clung until his death, and which he defended with all the powers of his genius, because he had once been devoted to it with so much success.

The dominant influence of pathologico-anatomical methods upon clinical medicine was growing daily, but these he looked upon askance. Choulant familiarized himself with the new doctrines only because of his duty as a clinical teacher. From this, however, he did not anticipate any enlightenment for the science of medicine. This line of research was, to him, still too much hampered by mechanical principles. Pathologic-anatomic examinations, as contrasted with the minuteness of life's processes, seemed to him by far too cruel. Choulant's favorite remark was, "To explain life's processes we are hardly able to do, for these processes will remain forever obscure with respect to their causes, in spite of all the advances of the natural sciences." This entire attitude of his was probably founded on the philosophic error of maintaining that man does not conceive nature, and that life in its changes will always have something that must remain obscure to the investigator.

What may have been the causes of Choulant's great errors? Perhaps, due to his great adoration of the antique, or confused by his adoration of pre-Christian wisdom, he did not see the great things that were brought forth under his eyes. But since all book learning breeds pride and overestimation, while the study of nature leads to modesty, we are

inclined to pardon his temerity of opposing singly almost the entire scientific world.

Perhaps his errors were rooted in the prejudice that it was beneath the dignity of a human genius to occupy itself with any experiments and with the particular, concrete things contained in matter, and especially to endeavor in this way to fathom the processes of life, as he was at no time a friend of minute objective investigation.

When his assistant showed him under the microscope a cast, a pus cell, a cylindroid, etc., he looked at the specimen, but with a smile that said, "You are seeking the solution of the matter where there is nothing to find." It may be that Choulant's errors were also due to his discouragement and the despair at the possibility of overcoming the many great difficulties encountered in the investigation of nature, a despair which seized the most serious and most cautious men, and which possessed Choulant all the more because, as a thorough student of history, he must have been familiar with all the many wrong paths which medicine and the natural sciences had taken from the time of the school of the Asclepiads until his day.

The many mistakes that were committed under Choulant's eyes in the somewhat hasty establishment of the new science were only too obvious to his keen philosophic mind, and were bound to strengthen him considerably in his view that his opposition was perfectly justified.

As happens so often in everyday life, the unskilled advocates of the new doctrine did it far more harm than its public opponents. The physicians who committed these errors should not be blamed too harshly, because they had to go through entirely new experiences, and the maxim that holds true for all times was as true then as now, that there is only one road to truth and that through failure and error.

The earnest representative of modern medicine at the Academy during the period of the reform movements was Hermann Eberhard Richter. With the vivacity of his character and Choulant's rigid resistance, serious disputes were unavoidable. Shortly before the outbreak of the uprising in Dresden in May, 1849, Richter proposed in a session of the university senate, in the presence of Choulant, that "the senate should suggest to the Royal Ministry of the Interior that the present director of the Academy, Ludwig Choulant, be relieved of his office on account of his utter inability to fill the position."

Choulant later used all his influence to effect Richter's acquittal, and shortly after, Richter was imprisoned for twenty years for his part in the uprising. Richter's imprisonment was a hard blow to the

Academy, while the intellectual youth looked upon him with affectionate reverence, as upon a martyr of a just cause.

His place was given to Paul Mahrbach, who, during Richter's imprisonment and trial, held the vacant chair temporarily and after Richter's dismissal, was permanently appointed. He was a man of wide knowledge, with a thorough clinical training, which he had obtained at Prague, Vienna, and Paris. As time went on, Choulant grew more and more tolerant toward the practice of the new method. During the years 1852–53, and also later, he had the results of physical examination regularly reported to him and even demanded them if they had been omitted. But he never became a warm friend of the new school. He was tolerant only under the stress of circumstances, and he let no opportunity pass to expose its faults, or to accuse it of any inconsistency. From the day when Choulant tacitly admitted his defeat, he lost all the mental elasticity and decision of character which had distinguished him before. He became yielding, mellow, sometimes vacillating. He actually seemed to have lost his true love for the profession and was always morose and sullen. This depressed mood seemed to be the predecessor of his hard sufferings later.

In 1852, Ficinus was retired. The chair of chemistry and physics that became vacant at the Academy was not filled again. The pupils were referred to the School of Technology for the study of these subjects. This was the first serious step taken by the government which endangered the independence of the Academy in a high degree, and it left no doubt that the royal government had the definite intention of dissolving the Academy. The protests registered against this by the professors of the Academy were shelved. In the same year, Choulant was compelled to acquiesce in the appointment of Friedrich Albert Zenker. Now pathological anatomy had at last an independent representation at the Academy, for up to then it had been Mahrbach's duty to compensate this want.

In an inaugural address lasting an hour and a half, Zenker spoke on the significance of pathological anatomy for diagnosis and on the method of a successful treatment. The address was almost overburdened with striking examples, and the trembling, obviously not unembarrassed, orator seemed hardly to have the slightest idea that almost every one of the many well-thought-out examples was necessarily a death blow to the system of the last great physician of the old school who was among his audience. Zenker concluded with these words, "I shall do everything in my power in order to succeed in awakening in you, my future pupils, a sense for pathological anatomy."

Choulant could not conceive of the representation of pathological anatomy at the Academy as an acquisition in any way beneficial to the institution, but rather as a usurpation of an antagonistic party.

Choulant was not without great significance as a physician and clinical instructor. The schedule in his clinic was so arranged that first he had a ward walk, he himself examining the patients, continuing his observations, and giving orders. In the classroom began the actual instruction. This arrangement was at once revoked when Mahrbach took over the clinic.

All that could be gotten out of symptomatology he positively extracted from it. He understood how to present pictures of disease in so fresh and vivid a manner, and to inculcate them upon the student's mind so lastingly, that he excelled in this respect perhaps all of his earlier contemporaries. For nothing was more hateful to him than untimely theorizing. "Emphasize that which is practically useful," he remarked to the student who was about to fabricate a hypothesis; for he absolutely rejected hypotheses at the bedside. At the same time, he was an extremely fine observer as regards the facial expression, the color and temperature of the skin, the heartbeat, the manner of breathing, etc., and, having a very fine sense of touch, he very successfully practiced palpation. He was also an excellent judge of the results obtained. Taking everything into consideration, one is amazed at the fact that this practical genius would have nothing to do with a procedure the advantage of which is so obvious, viz., the physical examination of patients.

At student examinations he always emphasized the essentials. A student who could think, without becoming confused, and had a somewhat thorough knowledge of the subject and a certain amount of boldness, did not find it hard to pass an examination under Choulant. His whole effort was bent upon producing thinking, independent physicians. He was fond of quick and sure answers, but seriously rejected references to literature and authorities, exclaiming "Spare me your book-wisdom and your authority worship."

Choulant's work as a forensic expert belongs to the most excellent achievements of his life. Here he availed himself of his "iron" logic, his great critical ability, and particularly his encyclopedic knowledge. Often he let loose the reins of a passionate character and made the court or district physician in question feel his mental superiority, frequently becoming personally offensive. In this way he made numerous enemies, which he could very well have avoided by a more moderate treatment of matters in hand.

Certain it is that he was passionate, even ill-tempered, bearing grudges, rarely friendly, domineering, not free from the sullen earnestness and the embittered mood of many scholars. He was, therefore, more dreaded than loved, and yet he was generous, sympathetic, kind, charitable, and even magnanimous and anxiously interested in the welfare of his students. He was never tender, at least not toward young people, but he was not wanting in affection for them. One would not be uncharitable in saying that the later career of Choulant might almost bear out the bitter modern proverb that "the old are natural enemies of the young." He was as immoderate in his love as in his hatred and therefore very partial, always suspicious, and inclined to listen to reproof rather than praise. He was also very firm and clung obstinately to standards which had once been recognized as true. He was the foe of progress, the "misoneist" and friend of things as they were, the *laudator temporis acti*, though for all that a man of formidable character.

Like all great men, Choulant was not free from idiosyncrasies and peculiarities. He was a fanatic indulger in Sunday rest, and woe to the candidate who had planned to visit him on that day. He would not tolerate anyone looking at the clock in his presence. He could become very much irritated when an out-of-town physician came to pay his clinic only one visit. "How long do you want to stay?" was the standing question. If the answer was, "'Till tomorrow," the physician in question was, as a rule, refused permission to visit the clinic. He was of opinion that one visit could never suffice to form a correct judgment of his person and his institution, and for the satisfaction of curiosity neither his institution nor his person were on exhibition. He was possessed by an almost morbid suspicion that every stranger physician was an opponent of his, who had only come to have an opportunity to say evil things of him. In this respect he used no discrimination, and when a famous professor of a neighboring university visited his clinic he was treated no better than anyone else. He lived in actual fear of the disrespectful books that might be written about him and his institution.

Choulant could be quite jolly when among his friends and did not disdain the joys of a dinner, but he was never immoderate. He was then very talkative and had a knack at entertaining most cleverly. He exercised an actually magic influence upon those who came in touch with him. One had to exchange only a few words with him to know what a great man one confronted. All who knew him more intimately were attracted to this spirited, genial scholar, and were broad-minded

enough to welcome the great advantage of his company in exchange for his uncouth character. In justice to truth, it should be remarked that these external characteristics, too, became more and more bearable the longer one was associated with Choulant. Once he had poured out the full measure of his disfavor upon anyone, he could meet him the very next day most cordially with everything forgiven and forgotten. Very often the thought that he might have gone too far tormented him. Choulant, more than anybody else, found himself dependent upon an original quality of his soul, and it seems certain that the occurrences which prepared his severe mental disease were not without causal influence upon his violent character. He was of small stature and had a moderate scoliosis. His feet and hands were unusually small and delicate, his forehead moderately high, but the skull beautifully curved about the parietal region.

Choulant's illness was quite unexpected. In February, 1858, it was reported that Choulant had had apoplexy, resulting in aphasia and in a partial facial paralysis. This, however, cleared up, and shortly afterward he was again active. But very soon he had another stroke, and this time his tongue, that tongue which had cost many a poor surgeon bitter tears, was permanently paralyzed. That summer he went to visit a friend and student in the country, but after several weeks' stay he returned not very much improved. Often he broke out into bitter tears when he tried to speak and his tongue failed him. He felt deeply the hopelessness of his position, for sometimes he fell into utter despair, and only the kind words of his daughter could appease him.

Relief arrived even before his death. With progressive paralysis, his mental functions decreased proportionately. He became more and more inactive, more and more inert, and when, on July 18, 1861, exactly one and a half years after the first stroke, his family, who thought he was sleeping, came to his bedside in great apprehension, they found him dead.

An autopsy was made by Zenker and showed cerebral edema, atrophy of the brain, especially the cortex, moderate hydrocephalus of the lateral ventricles, and foci of softening in the pons, in the cerebellum, and in the medulla oblongata.

On the morning of Sunday, July 21, the body was buried in the Catholic cemetery of Dresden. The remains were followed by a large number of friends, colleagues, pupils, and admirers of the deceased. A warm July day favored the interment services. Arrived at the sanctuary, and after finishing the rites of the church, the officiating priest began to

portray in truly touching words the achievements of the deceased, his significance to the world, and especially his severe suffering, in a style which, free from any dogma, made a profound pathetic impression upon the bystanders, in spite of its simple form. He particularly emphasized that, however hard the suffering had been as far as the deceased was concerned, God should be praised for having shrouded Choulant's mind before his work, to which he had devoted all his life, collapsed. After Privy Medical Councilor Unger had given an account of Choulant's life, Ludwig Reichenbach, his most intimate friend, spoke similarly in affecting words. He mentioned how, in leisure hours especially, they had often complained to one another of their grief and of their fear that the Academy would at last fall a victim to the attacks continually made upon it. Both had hoped that, perhaps through medical reforms, something would be done to save it, but herein they were also disappointed, and for that reason he, too, could only think it a blessing that Choulant was mentally dead when the closing of the Academy was definitely decided upon.

In conclusion, let us go back to the time of the Academy, when on September 24, 1856, this institution celebrated the fiftieth anniversary of Ernst August Pech's activity as a physician. From all parts of the country his former pupils had come to pay homage to this venerable man. The meeting took place in a hall of the city council and was opened by Choulant with a most spirited address. He considered himself unfit to portray satisfactorily the achievements of Pech, to celebrate his jubilee, and offered instead a festal discourse on the fate of the School of Salerno, well worthy of the occasion. Choulant was also the author of the memorial address published by the faculty of the Academy on the beginnings of scientific natural history and its graphic illustration in the Christian Occident. After a thorough discussion, showing a profound study of the sources in question as to whether the school was of secular or ecclesiastic origin, he arrived at the conclusion that it was probably of ecclesiastic origin and was founded about 1000 A.D. by the Benedictines of Monte Cassino. He also determined, in an equally thorough manner, the probable date of the "Regimen Sanitatis Salernitanum," described its great significance for ancient medicine, and discussed the activities of the school as well as the fate of its probable founder, the abbot of Monte Cassino. He mentioned the unusual privileges granted to this school by emperor and empire, and tacitly drew, well understood by the initiated, a parallel between the fate of this school and his Academy by mentioning the establishment and the growth of the

proud University of Naples which, very gradually, deprived the school at Salerno of all its privileges, particularly the right of promotion, and was thus the cause of its gradual decay. What was then said of the School of Salerno at the conclusion of his address may be said here of him as a fitting close to this sketch, "Like everything human so he, too, had his beginning, his growth, his time of bloom, and his retrogression and fall."

HISTORICAL INTRODUCTION

The figuration of the anatomic form of man by the graphic arts aims either to make the teaching of human anatomy more plastic for the anatomist and physiologist, engraving it on the memory, or to give the plastic artist a clear, scientific basis for his studies of the human figure. Generally speaking, it is therefore partly a feature of the applied science of human structure, partly a phase of the graphic arts.

The illustrations employed for the study of anatomy are of three kinds. One is merely schematic; another represents with exactness a particular subject; while the third shows an ideal human figure constructed from the constant mean proportion of several types.

The merely schematic drawing attempts only to present in outline the main characteristics of one or more parts. It either disregards an exact knowledge of the form or assumes possession of such knowledge by the observer. Schematic drawings, therefore, were employed, not only at a time when precise knowledge of individual organs was lacking, but also in more scientific periods, in which the main purpose was to elucidate certain physiologic principles by the general form and location of the organs, an adequate knowledge of which must be presupposed either for the purpose, or in aid of an ideal, a general scheme for zoötomic and postmortem comparisons.

The drawing which is individually true to nature aims at picturing a part in all its details, just as it is found in the individual. This mode of illustration occurs particularly in pathologic anatomy, where the unknown forms of certain organs have to be shown in the individual for the purpose of further investigations, as is often the case in the study of human embryology and comparative anatomy. This method of representation disregards the fact that each internal organ, like the countenance or other externalities, is based upon a common ideal type which conditions its form; on the other hand, in each individual this type presents peculiar deviations from the normal which do not accord with the generic form but serve to make it individually distinctive, and which must therefore be disregarded when the true type is sought.

Attempts at individually correct presentations first appeared, therefore, in that period of anatomic study in which students were dissatisfied with schematic drawing, but at the same time were still unfamiliar with

all the various structures of the human body, and in aid of further progress had to rely upon the proportions of the ideal figure. The failure of that effort is manifested partly in careless and incorrect reproduction of forms, and partly in arbitrary deviations from the correct type, due either to the unconscious influence of preconceived ideas or to ignorance of the significance of the figure in detail. Wherever the artist alone, without the guidance and instruction of the anatomist, undertakes the drawing, a purely individual and partly arbitrary representation will be the result, even in advanced periods of anatomy. Where, however, this individual drawing is executed carefully and under the supervision of an expert anatomist, it becomes effective through its individual truth, its harmony with nature, not only for purposes of instruction, but also for the development of anatomic science; since this norm (*Mittelform*), which is no longer individual but has become ideal, can only be attained through an exact knowledge of the countless peculiarities of which it is the summation.

The figuration of the ideal and invariable norm is the only one suitable for teaching purposes, and the development of this representation corresponds with the growth of the science of anatomy in all its periods. This kind of illustration presupposes a vast amount of previous labor and cannot result from a primitive knowledge of the human figure, nor come out of a period in which the science of anatomy is neglected. Yet it must not be forgotten that the normal representation of the various structures of the human body, as being that which is conditioned by the beauty of the human figure, may either be vaguely sensed, like this very beauty itself, or may be partly grounded in science. This vague feeling for beauty was possible even in an early period, when conditions were especially favorable to an artistic point of view, as was particularly the case in the first half of the sixteenth century. The scientific foundation requires exact and extensive dissection and was employed whenever time and place were more favorable to cold scientific research than to ardent artistic vision, as happened plainly during the seventeenth and eighteenth centuries. Only the combination of these two tendencies can satisfactorily serve advanced anatomic science, affording a secure basis and bringing it to perfection through conscientious exactness in details and ceaseless observation and comprehension of beauty in the whole figure.

Artistic anatomy, that is, the knowledge of the human body as applied to the plastic and graphic arts, has no use for the mere schematic representation, since a knowledge of the anatomic form of the parts

cannot be presupposed, but must be taught. Nor will an exact individual representation serve, because the creations of the artist must rise above individual conditions. For artistic anatomy, then, nothing else is of value but the idealized drawing of anatomic structures. Such anatomic instruction will be all the more valuable to the artist the more completely and intuitively it selects for him, and the more lucidly it presents to him, what he needs, and the more carefully it eliminates what is of no value; for the unnecessary is harmful. The professional anatomist often presents too much of artistic anatomy in textbooks, and quite as often lacks insight into the true needs of the artist; consequently he often leaves the artist helpless in the most urgent emergencies, in spite of the exhaustive character of his anatomic teaching. The plastic artist himself, when he undertakes such instruction for his confrères, is usually neither sure nor exact in his anatomy, and usually gives too little. Worthy productions of this kind must therefore be based upon artistic insight and anatomic knowledge alike, and must be conceived by the anatomist under the guidance of artists, or *vice versa*. Of immediate necessity is the study of the antique as that representation of the nude which visualizes the actual healthy form in all its fulness of life and fire of movement, and thus adds an element which can never be supplied by purely anatomic delineation.

The history of anatomic drawings can be developed only by attention to these variances, and to the equal progress of both tendencies, the scientific and the artistic. We shall have to consider anatomic illustration from two viewpoints:

1. The aid rendered to anatomic science by the graphic arts;
2. The aid rendered to the graphic arts by anatomic science.

In its aims the first, or scientific anatomy, may be considered as: (*a*) schematic illustration and aids to memory; (*b*) individual representation of one individual; (*c*) idealized reproduction of the anatomic norm from a number of individuals, partly more artistic, partly more scientific in conception; while the latter, or artistic anatomy will be studied in its tendency to follow the best examples offered by scientific anatomy, comparing these with the best examples of existing works of art, and showing how it approaches more and more closely the true needs of the artist, and eliminates more and more all that does not answer these needs or violates them.

Such a historic discussion, if exhaustive, would have to be very extensive, and only a short outline will be attempted. For reasons given on page 42, a historic appreciation of anatomic illustrations of the

classic period will have to be left out of consideration. Our discussion, therefore, can begin only with the period of the revival of anatomic science in the fourteenth century, and for reasons stated in the Preface, we can pursue this subject-matter up to the present time for artistic anatomy only, not for scientific anatomy. Within the time-limits thus indicated, however, anatomic illustration has a history, and it can surely not be uninstructive to follow this through the course of time with unprejudiced and watchful eyes. We can readily distinguish the following six periods:

I. PRIOR TO BERENGARIUS DA CARPI (1521)

The earliest attempts at anatomic representation by schematic drawings in aid of medical and anthropologic studies. Artistic anatomy as a private study of prominent artists for their own purposes, in consultation with anatomists, yet without any intention to teach others.

II. FROM BERENGARIUS TO VESALIUS (1521–1543)

Attempts at individually correct anatomic illustrations, which gradually free themselves of schematic and arbitrary features. Instruction for scientific purposes, also popular anatomic illustrations.

Artistic anatomy for the instruction of others, as undertaken by anatomists and artists.

III. FROM VESALIUS TO CASSERIUS (1543–1627)

Artistic conception of the anatomic norm; a great many discoveries and corrections of details; thus in two ways furthering anatomic science. Italian School of Anatomy; highest development of the anatomic woodcut.

Artistic anatomy is content with the ideal representation of anatomic parts as conveyed in artistic manner by anatomists, and adopts the doctrine of the proportions of the human body. School of Carracci; efforts of the artists to gain firm ground in matters of anatomy so necessary to them, through practical dissection under the guidance of anatomists.

IV. FROM CASSERIUS TO ALBINUS (1627–1737)

The effort toward perfect training in details and toward artistically perfect reproduction through the medium of engraving; woodcutting is neglected; colored copperplates are at times attempted.

Artistic anatomy gains its first independent publications; it clings to Vesalian patterns, along with a comparative study of the antique.

V. FROM ALBINUS TO SOEMMERRING (1737–1770)

Scientific conception of the anatomic norm; greatest exactness in all details; the Leyden School of Anatomy; copperplates alone predominating.

Artistic anatomy vacillates between Vesalian and Albinian patterns; more independent attempts are less successful.

VI. FROM SOEMMERRING UNTIL MODERN TIMES

(Beginning with 1778)

Combination of utmost anatomic truth with artistically beautiful reproductions; adoption of lithography, the steel engraving, and of the daguerreotype among the newer reproductive means; revival of the woodcut in an improved form. Two large collections of existing anatomic illustrations conclude the century. Histologic and microscopic anatomy.

Artistic anatomy adopts the Albinian patterns exclusively and gradually rises to greater independence. It is employed by both artists and anatomists.

After these explanations we shall now follow the history of pictorial anatomic representation in such a fashion as to give the clearest possible view of its development. While the sections on pages 42–361 are intended for elucidation and for biographic as well as bibliographic details, this historical review will include events and achievements which, through their nature, have no place among those comments, and yet are essential to a complete presentation of the subject. This historical introduction, therefore, together with the sections given in the text, constitutes a complete whole as to form and contents.

FIRST PERIOD (UP TO 1521)

With the revival of the sciences during the earlier Middle Ages physicians hardly felt the need for anatomic reproductions from nature; but even if there had been such a need, it could not have been satisfactorily met, since human bodies could not be dissected. Moreover, it must be recognized that all medical science had come to us from the hands of the Arabs, to whom dissection, and even pictorial representation of the human figure, was prohibited according to the laws of Islam. Thus no anatomy existed in the medical schools except that which was found in writings regarding the site and relations of the parts, as taught in the Galenic-Arabist canon.

Even in the fourteenth century, when dissection of human bodies became possible, the need for anatomic pictures was so slight that Mundinus (1316) published his famous and much-used manual of human anatomy without illustrations, and without ever even referring to any. If there had been a demand for them, even by instructors or students, surely the artists who decorated the manuscripts with miniatures of very unequal value would have been quite ready to include such illustrations, even the merely schematic. Yet we do not know of any anatomic designs from manuscripts of that period, and have not been able to find any reference made to such in the writings of physicians of that time.[1]

After the invention of book printing in the second half of the fifteenth century, when the reproduction of books was zealously practiced, and when the woodcut, at the same time, made the increased multiplication of pictures possible, still no other demand than that for schematic-anatomic representation was expressed by physicians. It was desired to represent pictorially and put before the student what, up to that time, had been preserved only through words and memory. For this reason the illustrations in Ketham (beginning with 1491), though intended for physicians, are nothing else than schematic representations. Peyligk's (1499) and Hundt's (1501) illustrations, intended for philosophical instruction, are of exactly the same kind.

The needs of the graphic or plastic artist were entirely different. When art had freed itself from conventional forms and reapproached nature, the artist found himself in need of actual knowledge of the anatomy of the human body, in order to lay a firm foundation for the study of the nude and the reproduction of the human figure. For that purpose, artists probably consulted quite frequently with physicians, and practiced in secret, not only on the human cadaver, but also by means of more or less hasty sketches, either for their own general information or as preparatory studies for projected works of art, e.g., da Vinci, Buonarroti, Raphael, and others.[2] But there was no intention of

[1] The subject of MS illustrations of anatomy has been exhaustively treated by Professor Karl Sudhoff in his elaborate monographs *Tradition und Naturbeobachtung in den Illustrationen medizinischer Handschriften und Frühdrucke, vornehmlich des 15. Jahrhunderts* (Leipzig, 1907), and *Ein Beitrag zur Geschichte der Anatomie im Mittelalter, speziell der anatomischen Graphik, nach Handschriften des 9. bis 15. Jahrhunderts* (Leipzig, 1908), also in his special studies of the manuscript sources of Ketham, the schematic eye, and the "Fünfbilderserie" (*Archiv für Geschichte der Medizin, passim*). See pp. 48–87.

[2] For a highly original account of the advances made in this direction by the artists who preceded Leonardo's teacher, Verrocchio, see the paper of Dr. Edward C. Streeter on "The Rôle of Certain Florentines in the History of Anatomy, Artistic and Practical," in *Bulletin of the Johns Hopkins Hospital*, Baltimore, 1916, XXVII, 113–18.

teaching others. This relation and communication between anatomists and artists of the first class seems, at least in Italy, to have been not without favorable influence upon the former, and may have originated the notion that, even for medico-scientific anatomy, equally good work might be done and better things accomplished than had hitherto been the case.

The physician Marc' Antonio della Torre must have been led to see the necessity for anatomic studies from nature through his excellent medical training and his endeavor to substitute something better and more natural than Mundinus' *Compendium*. What he accomplished is lost and remains completely unknown.

Leonardo da Vinci's enormously versatile mind, his unceasing endeavor to be simultaneously active in several subjects quite foreign to his art, carried him farther than any other artist of his time into the knowledge of the anatomy of the human figure, although here he always kept in view the purposes of the graphic and plastic arts, which required only the knowledge of bones and muscles. It is only in his figuration of sexual intercourse that he transgresses the domain of his art and touches upon physiology. This picture, however, shows a schematic treatment taken from books and not from nature, while his representations of the bones and the muscles are actually drawn from nature.[1] The collaboration of these men has benefited only the graphic and plastic arts, and not anatomic science. For this della Torre's premature death (1512) and da Vinci's removal to France (1515) are responsible.

SECOND PERIOD (1521–1543)

Within the range of anatomic science, reproductions from individual observations in nature had so far been out of question, and only schematic representations of what had then been accepted and handed down as true had been made. But with increasing facilities for scientific dissections at the universities and medical colleges, toward the end of the fifteenth and the beginning of the sixteenth centuries, a great many discoveries regarding single parts of the human body had been brought to light, which led to the correction of hitherto accepted beliefs. The remarkable perfection of the art of wood engraving also proved highly useful for anatomic representations from nature, just as it had formerly served in the production of schematic representations of anatomy.

[1] It is now clear, through the newer reproductions not known to Choulant, particularly through the researches of Holl and of Sudhoff, that Leonardo went far beyond the *Venus obversa* in his studies in physiologic anatomy.

The man who, at this time, had made the most independent anatomic investigations with a scientific understanding, and who had made most of the anatomic discoveries, was Berengario da Carpi (1521), from whom also originated the most comprehensive attempt of his time at anatomic illustrations from nature. He appears to have maintained an artistic point of view in all his works, emphasizing preferably the bones and muscles, and rarely reproducing the viscera. He was himself artistically gifted and maintained relations with artists and friends of art. But the stimulus which he gave through his own illustrations alone sufficed, thanks to the accumulating mass of material, to do away with servile delineation from descriptive matter, and to bring about the sketching of anatomic drawings from nature. In this way, Eichmann, as early as 1537 to 1541, became prominent through a much larger number of illustrations, and, before 1543, an attempt at lifelike delineation of muscles, with an exactitude hitherto unknown, was made by Canano, but not carried to completion.

Thus even in the first four decades of the sixteenth century much interest in anatomy was apparent, partly indeed in the correction of existing material and the discovery of new material by means of individual dissection, partly in drawing from nature, a method which was now never again to be abandoned.

Along with this even a third tendency becomes noticeable, due chiefly to the participation of better artists, namely, the feeling for formal beauty and artistically appealing illustrations in anatomic works of a scientific order. This aim becomes especially apparent in the work of Charles Estienne (1539–45), not, however, without encroaching upon anatomic clearness, giving preference to the nude over the dissected body, and showing a distracting predilection for poses and accessories, quite in the taste of the school of Fontainebleau artists.

Even earlier than this there had been a tendency toward representation of the whole body instead of single parts, namely by Berengario. Later, broadsheets were published, showing an oftentimes obsolete and inadequate anatomy of the whole body as then known. These sheets can be designated as fugitive sheets (*fliegende Blätter*) with pre-Vesalian features. They seem to have served partly for popular instruction, partly to refresh the memory of bath-keepers and barbers. No less a personage than Vesalius himself, in 1538, published just such loose prints, his first six plates (see pages 169 and 171) being sheets of this kind, although not intended for popular instruction but rather in aid of strict anatomic science. Even the influence of these plates was very remarkable

and widespread, though the true and abiding influence of Vesalius is first felt in the following period.

As regards actual artistic anatomy, there becomes apparent, aside from the ambition of individual artists to gather information for their own technical achievements in human anatomy, a first attempt at furnishing instructive material for their fellows in art. Rosso de' Rossi's drawing (p. 110) is not, as the works of artists mentioned before him, a sketch for his own use or an anatomic study for a prospective work of art, but evidently a drawing carefully prepared for the instruction of other artists, to which he would probably have added many others, if his death had not interfered. (He committed suicide on account of unfortunate circumstances, 1541.)

THIRD PERIOD (1543–1627)

The attempt at correction of errors and the discoveries in anatomy, in conjunction with the custom of drawing, not schematically, but from nature, led to the elimination of traditional mistakes, to the increase of anatomic knowledge, and to the improvement of anatomic illustration. On the other hand, the fact that the artists employed by anatomists as illustrators aimed to strive for beauty, as well as for accuracy and truth in their anatomic drawings, led to the development of a true anatomic norm, mainly noticeable in the skeleton and the muscles. That there was an anatomic norm and that it must be beautiful was rather artistically sensed than scientifically recognized. The artist had arrived at this conviction because the beautiful character of the nude, dependent upon bony and muscular structure, necessarily presupposes a beautiful form for these structures also. The anatomist shared this feeling, because the anatomic norm, as the expression of nature's highest endeavor, must needs express the ideal purpose which appeals to us as beauty in all the works of nature.

Vesalius, in his principal work, published in 1543, attained all three ends at once and in most striking manner. He eliminated anatomic prejudices through scholarly criticisms; he brought the new data with which anatomy was enriched into a consistent whole; and he raised the anatomic norm to an artistically beautiful mode of representation. He thus became the founder of that epoch, which has been called the Italian School of Anatomy, in which the mere scholiasts who defended Galenic authority fought the actually dissecting anatomists until, after many struggles, the latter won an uncontested victory.

The influence of the graphic and plastic arts was essentially effective during this time. For, while Eustachius and Fallopius busied them-

selves with dissections, the correction of errors, and new discoveries, and had undoubtedly observed a great many details more correctly than Vesalius, the beautiful character of the latter's illustrations (which the two former neglected in their own) appealed overwhelmingly and convincingly to most anatomists. Contributory to this end, indeed, were the systematic arrangement and completeness of Vesalius' principal work, as Eustachius and Fallopius published only collections of rather scattered observations. Furthermore, Vesalius recognized the necessity of supplementing his great and comprehensive masterpiece by an abstract in the form of a homogeneous array of specimen pages, the *Epitome* of 1543, which was naturally bound to gain a wider circulation than the abstruse and expensive *Fabrica*, published in the same year. Realdus Columbus (1494–1559), another anatomist to be counted among the leaders of the Italian School, did not publish any illustrations in his anatomic work, and its appearance belongs to a later date. Estienne, already mentioned, who in one work linked himself with both pre-Vesalian and post-Vesalian periods, drifted from the crude and stiff figures of an earlier epoch to the livelier representations of a newer tendency, without, however, avoiding, as Vesalius did, exaggerations, superfluities, and unnatural features. Yet it will always remain difficult to pass just judgment upon his merits, as opposed to the merits of the Italian School, on account of the length of time which elapsed before his work was published (completed 1539; printed 1545).

Undoubtedly the reformation of anatomy had been started by Vesalius' industry, learning, and artistic sense, and all authority contradictory to nature had been destroyed forever. At the same time anatomic illustration had reached its climax, that is, the highest perfection possible at the time. The anatomic woodcut had also reached its height, but from then on, for reasons apparent from the general history of the graphic arts, had to give way to copperplate engraving. One particular cause might indeed have been the increasing accuracy of detailed anatomic researches, for which the woodcut, as it was then developed, seemed inadequate. While Vesalius' artistic sense furthered the extension of anatomic science to a high degree, the artistic merits of his pictures also became a stimulus for the graphic arts. From these illustrations independent artistic anatomy, the special anatomy of artists, originated. This development, however, belongs to a later period.

After significant and successful efforts at reform, a period of relaxation and of slackened activity generally follows, in which further reform movements cannot be attempted, on account of the victory already

achieved, or, if undertaken, cannot be repeated with the same success, owing to the excellence of the reforms attained. Imitation and the completion of details are thus the only results brought forth, and it is then praiseworthy if the former does not become blind servility, and if the latter is carried forward in the spirit of the great precursors. Such a period followed the reformatory endeavors and achievements of the Italian School of Anatomy, and particularly the overtowering labors of Vesalius.

The dissemination and imitation of Vesalian illustrations was extraordinarily widespread. They were most exhaustively plagiarized in the often reprinted and revised work of the Spaniard Valverde de Hamusco (1556). But we find their influence again and again in the anatomical compendiums of the period, e.g., in the second half of the sixteenth century, in the plates of Jacques Guillemeau (1571), of Felix Plater, of Salomon Alberti (both of 1583), of André du Laurens (1598), and others, until finally Caspar Bauhin, at the beginning of the seventeenth century, published the most complete collection of anatomic illustrations, on a new plan, but of only mediocre artistic worth.

In the extension of anatomic science, in the increase and correction of anatomic facts, Guido Guidi (1569), Volcher Coiter, one of the earliest zoötomists (1573), Costanzo Varoli (1573), and many others were particularly active. But these are less notable for changes in graphic modes of representation than for anatomic discoveries of historic import. They belong, with those mentioned above, in the second half of the sixteenth and even to part of the following century.

We have already remarked how the graphic and plastic artists obtained their necessary instruction from the perfectly beautiful presentations of bones and muscles which Vesalius had given. The tendency, however, to select these pictures for the particular uses of the artist and to collect them in so far as they were of service to him in separate works, becomes prominent simultaneously with a movement which then greatly interested the art world, but which is rather foreign to our subject, viz., the founding of the doctrine of the proportions of the human body. In the work on proportions by the Spaniard Juan de Arphe (1585) the anatomy of the bones and muscles is also treated, which was not the case in the similar German work of Albrecht Dürer (1528). The former should therefore be considered the earliest of the numerous works which dealt with anatomy for graphic and plastic artists as their particular subject. Here, too, Vesalian influences are obvious, although the author remained more independent in this regard than most of the others.

To this period belongs the eclectic art school of the Carracci, of Bologna, whose founders and leaders, Ludovico Carracci (b. Bologna 1555, d. Bologna 1619), Annibale Carracci (b. Bologna 1560, d. Rome 1609), and Agostino Carracci (b. Bologna 1557, d. Parma 1602 or 1605), should be mentioned. In addition to other theoretical studies of use to the artist, the study of human anatomy was followed. Instruction in the subject had been undertaken by Agostino, assisted by the anatomist Fantoni, who should not be mistaken for the Turin anatomist Fantoni (d. 1758). In this school, still flourishing at a much later time, the physician Giuseppe Lanzoni (b. Ferrara 1663, d. Ferrara 1730) was also active in anatomical instruction.

In Rome the painter Luigi Cardi (b. Empoli 1556, d. Rome 1613), usually known as Cigoli or Civoli, occupied himself very earnestly with anatomic studies for the sake of his art, and his anatomic statuette was favorably regarded for a long time in the studios of artists.

FOURTH PERIOD (1627–1737)

At the beginning of the seventeenth century, Caspar Bauhin's compendium, a useful work covering all human anatomy and provided with numerous illustrations, had appeared. Although highly appreciated by physicians and students of scientific anatomy on account of its completeness, this book was nowise a successful effort as to artistic execution. With the Vesalian achievements in mind, the demand naturally arose for a pictorial anatomy in copperplate engraving (which now prevailed over the woodcut), similar to that which the woodcut had made possible in Vesalius' works, and also to create, with the means which the art of copper engraving made possible at the time, something equal to what the Brussels anatomist had achieved with such eminent success.

To this demand, Giulio Casserio responded with copperplates (1627), comprising the whole of human anatomy, and which, first in part published after his death, never attained the large circulation and influence of the Vesalian plates. There now arose a divergence from scientific accuracy and a tendency toward affectation, such as Remmelin's pictures (1619), which were superposed on each other and could be turned like the pages of a book according to the sequence of parts. These pictures had, it is true, found their precedents among Vesalius' six plates and, repeatedly, among fugitive prints (*fliegende Blätter*), also in other works of the sixteenth century, but could not be of any value for thorough anatomic study, nor for artistically beautiful representation.

At the same time appeared the insipid, inconvenient, and inexact plates of Bourdon (1678), which could not but lead farther away from truth to nature and artistic beauty in anatomic illustration, had they gained any appreciable influence through a wider circulation.

In contrast with these utterly inartistic tendencies Bidloo's plates (1685) seem like a return to something better, and would have represented the very best of this period had the anatomist been just as conscientious as the artist, and had the latter himself recognized more fully and valued more highly the true beauty of nature.

As regards artistic and scientific values, the plates of Santorini (1724) and Cheselden (1733) are to be rated much higher. Of the former only the smallest part were published during this period (1724). Of the latter we refer chiefly to plates on osteology, since what he gave along other lines of anatomy is hardly mentionable in comparison with the work of Casserio and Bidloo.

For the usual needs of anatomic compends, smaller and much inferior illustrations of no artistic value were made. Among a great many others, we have chosen for a separate section (p. 243), Johann Vesling's plates, which were the best circulated since 1641, and have added the very rare plate by his assistant Wirsung. In 1651, Vesling's plates were followed by the extensively circulated compend of the scholarly Dane Thomas Bartholinus (1616–80). This work contained numerous copperplates, partly after Vesalian patterns, but after 1691 it was gradually displaced by the briefer compendium of the Dutch Philipp Verheyen (1648–1710), which also contained new, but very poor, anatomic plates. These were followed in 1722 by imitations of Verheyen's plates by the Danzig physician Johann Adam Kulmus, which ran through many editions and were in part revised and provided with new engravings. They attained a wide circulation. Many other anatomic textbooks of this period had no pictures at all or, at least, no complete series, since the aim was to produce books as cheaply as possible for the use of the student.

Coloring of anatomic figures was early attempted. We know of pictures by Ketham (p. 115) colored by patrons, and of some fugitive prints (p. 156) which were colored. Vesalius undertook to have his works colored, or at least the part which is now at Louvain[1] (p. 183). Later parti-colored anatomic pictures may also be seen. This early tendency to color anatomic drawings grew out of the habit of seeing

[1] This beautiful copy was lost in the burning of the library of the University of Louvain during the invasion of Belgium by the Germans in 1914.

many-colored illustrations, even in manuscripts of scientific character (p. 45), and had no scientific or artistic value. The professional anatomist is rarely in need of discriminating through colors in his pictures, for color is ever apparent to him in his study of the cadaver. He needs color only in very complicated representations, for distinguishing arteries, veins, lymphatics, and nerves, and for these parts, red, blue, yellow, and white have been established as conventional colors. The layman wants to see those parts completely illuminated; the artist does not need any coloring at all, since he is concerned only with the coloring of the external parts of the body, which he cannot learn from the anatomist, but for which he depends on other studies.

Upon the discovery of the chyliferous vessels by Aselli (1622), it occurred to the latter to make them stand out clearly from the blood vessels and surrounding viscera. For this purpose he chose the colored or polychrome woodcut-print (*chiaroscuro*) as best suited for the purpose. This type of print, however, was not used in copies of the Asellian figures, nor in any other anatomic illustrations before or after Aselli.

Thus we find the polychrome print in wood engraving as a new means of representation of anatomic pictures, arising from the actual need of expressing more vividly what had been discovered.

Conditions were different as regards the colored copperplate of anatomic pictures which was introduced almost a hundred years later. This innovation did not grow out of an actual anatomic need, and did not at all originate with the anatomist, but was forced upon him by artists who were then undertaking to reproduce oil paintings by means of the colored copperprint. The only anatomic work of this kind by the inventor Le Blon, which is mentioned (1721), is of doubtful value. The larger and more numerous works of Gautier d'Agoty (beginning with 1745) have hardly any anatomic value; first, because crayon and mezzotint are not exact enough; and secondly, because Gautier himself was not careful with his illustrations, which were meant to be showy so as to attract buyers; nor could Gautier, as a layman, have been any more particular in matters of anatomic science. The colored copperplates by Jan Ladmiral (1736) have indeed had a great and lasting value for anatomy, but the difficulty of printing always tends to make impossible the treatment of anatomic subjects with the necessary freedom, variety, and accuracy; or at least to delay this attainment and consequently to raise its price in such wise as to prevent the colored copperprint from taking the place of coloring with the brush. Anatomists, therefore, gave up colored printing from woodcuts or copper engravings altogether, and

even Albinus, for whom Ladmiral had been producing his pictures, did not again employ this means, although he was very zealous to perfect the methods of pictorial anatomic representation.

During the first half of the eighteenth century two series of older anatomic copperplates of value were discovered; in 1714 those of Bartholomeo Eustachius, which had been engraved in 1552; in 1741, copperplates by Pietro Berrettini da Cortona, which were probably engraved in 1618. While the former bear the name of one of the most prominent anatomists of the sixteenth century, it seems impossible to discover the name of the anatomist for whom the latter series was made, while the engraver's name, although famous, is of doubtful authenticity. Eustachius' plates had remained hidden one hundred and sixty-two years, Berrettini's plates one hundred and twenty-three years, before their publication. The former possessed considerable anatomic value, the latter much higher artistic value, but both had been intended to serve an anatomic viewpoint which had long since become obsolete at the time of their appearance. Yet the publication of the former series led to many changes in the history of anatomic discovery by helping to trace many discoveries back to their real authors. The latter series gave to the anatomy of the nerves an artistic manner of representation which was later elaborated and perfected. Both series stood out noticeably among the anatomic representations of that time and were stimulating in many ways, but in accordance with their intention were not applied to the artist's use.

We have already pointed out how that part of anatomy which serves to instruct the plastic and graphic artists was developed independently, partly through the aesthetic beauty of the Vesalian figures, especially as regards bones and muscles, and also through the effort to determine the dimensions and proportions of the human figure.

The well-known anatomic drawing-book for artists, edited jointly by Rogers de Piles and François Tortebat (1668), which contains only Vesalian figures, is indeed the earliest artistic anatomy, if we leave out of consideration a similar work by Jacob van der Gracht, which obtained only a very small circulation, not comparable with that of Tortebat's book, and whose tendency, contents, and even time of publication have remained rather obscure. The artistic anatomy of Jacopo Moro (1679) was also fashioned upon Vesalian patterns. The school of Tiziano Vecelli, thanks to the then current opinion that the latter master was the creator of the Vesalian plate, hastened also to edit, under the title of *Notomia de Tiziano*, a selection of such Vesalian plates as were thought

suitable for artists, and to bestow upon this painter, who did not design the plates, the fame to which his pupil and even more the industrious and ingenious anatomist were entitled. The artistic anatomy of Carlo Cesio (p. 252) is also based on Vesalian drawings, and, as late as 1706, the Augsburg bookseller Maschenbaur published the original Vesalian plates.

On the other hand, we again find the theory of human proportions combined with artistic anatomy by a Spaniard, Crisóstomo Martínez (about 1680), of whose work, however, we have seen too little to judge its value. Here, the mathematical side of the doctrine of proportions seems to have been predominant.

More independent, treated with a true artistic appreciation, adhering to the findings of advanced scientific anatomy and, above all, closely following the antique, came the work of Bernardino Genga (1691), which stands out as the very best anatomy of the time for artists, a work of lasting value, equaled only by a few later productions of like character, hardly surpassed by any, and even today, of unique value to creative artists.

FIFTH PERIOD (1737–1778)

But all these acquisitions of the past, some of them new creations, were soon surpassed by the endeavors of the Leyden anatomist Bernhard Siegfried Albinus (1737), in whose work a scholarly treatment of anatomy as a critique of earlier achievements, the most careful investigation of details in nature, and an artistic sense for anatomic conception and illustration, were combined in apt fruition. He established a new method, as had Vesalius before him. But times had changed. Science, rather than art, was the word of the hour, and the scenes of activity of the two anatomists were entirely different. Vesalius, laboring in Italy, and in keeping with the spirit of his time, had discovered, with sure tact and an eye artistically trained, the true anatomic norm, especially for the skeleton and the muscles. This same norm was now sought by scientific methods, the undisputed principle having been established that what had been discovered in a single cadaver was not to be represented, but that the true norm was to be developed from the mass of observed facts. An untiring persistence was employed in determining this definite norm and the great artist Jan Wandelaer gave perfection to its pictorial representation. From now on only the utmost anatomic exactness based on rule and compass, only the highest possible truth in representation, only the true norm attained scientifically through the investigation of numerous subjects and controlling all that is peculiar

to the individual, could hope to be taken into consideration by science. This defines the Albinian period of anatomic representation, which is the feature of the Leyden school.

For artistic anatomy Albinus' anatomic skeletons and muscle figures now ranked with, and later actually superseded, the Vesalian plates which, heretofore, had alone been of value, especially since Albinus' anatomic researches comprised, not indeed exclusively, but in the main, the study of the bones and the muscles. These anatomic representations, designed for artists and executed with greater fidelity to nature, in conjunction with a more thorough study of the human form by careful measurements and a thorough anatomic observation of the antique by the artists themselves, led to a higher development of artistic anatomy during this period.

The Dutchman Peter Camper, himself famous as a graphic artist, a contemporary and admirer, though as regards methods of anatomic drawing, an opponent of Albinus, lectured on artistic anatomy and gave essential information to the artists through his treatises on the structure of the face and on the facial expression of passions. At the same time his endeavors to lay down a method for anatomic representation, in connection with Albinus' attempts along the same lines, were not without valuable influence on the scientific representation of anatomy. Camper has thus become of great importance in the history of anatomy and particularly in the history of anatomic illustration, although he never completed a book of any size in this field.

Wholly devoted to scientific anatomy are the works of Albert von Haller, who may be considered the foremost pupil of the Leyden School. He too was particularly eager to turn out precise reproductions of the anatomic norm. The arteries of the body and several of the viscera were reproduced especially well in pictures which, at that time, were the only good illustrations and, in part, are even now the best available. Haller paid less attention to beauty of presentation. In this respect the splendid works of William Hunter on the pregnant uterus and of the previously mentioned Cheselden on bones rank by far higher, since the foremost artists of England were employed in their execution.

SIXTH PERIOD (1778 TO MODERN TIMES)

In the finer anatomy of the brain, the organs of sense, and the nerves, two almost contemporaneous anatomists were especially active, the Italian Antonio Scarpa and the German Samuel Thomas von Soemmerring, who in respect to more exact representation, artistically

conceived, introduced a new epoch. Both were themselves draughtsmen; the former, to a high degree of excellence, since he drew all his important plates himself; the latter at least trained his own artists, and supervised them most carefully.

The distribution of the nerves in the body, and especially in the viscera, Scarpa raised to a hitherto unknown level of precise and artistic delineation. He was admirably assisted by Anderloni's masterful burin. All later representations of nerve distribution follow these unsurpassed patterns, more or less.

The anatomy of the brain and of the organs of sense remained Soemmerring's chief task throughout his entire life, in so far as his endeavors in the field of pictorial representations are concerned. During the best period of his activity his engraver was Köck, whom he himself had prepared for the work. Soemmerring followed in the steps of Albinus, whom he highly esteemed. His greatest ambition was to represent, in a manner scientifically exact and artistically beautiful, the anatomic norm as it must be imagined in the human body. Albinus was his model, just as his representation of the female skeleton was meant to be a counterpart to Albinus' illustration of the male skeleton (pp. 282, 305). This representation was of value also to artistic anatomy, which, however, is true too of several other of his plates on the organs of sense, as, for instance, the plates on the aesthetic ideal of the external eye and ear.

Although in view of their very similar aspirations, Scarpa did not accomplish anything for artistic anatomy, Soemmerring, at least in several of his illustrations, did much for it. Most of his works, however, concern themselves, as do all of Scarpa's plates, with the internal organs and, therefore, do not meet the needs of the creative artist.

Thus the epoch of anatomic representation begun by Albinus had reached, through the efforts of these two anatomists, the highest point of scientific development, and artistic anatomy had thereby become better adapted for the needs of art. Although Brisbane (1769) had already pointed out the excellence of the Albinian figures for purposes of graphic art, this tendency of artistic anatomy seems to have originated with the Dutchman Cornelis Ploos van Amstel, whose beautiful drawings, like the Fischer statuettes (*circa* 1784), so well known in German artistic circles, were wholly Albinian. Later on, attempts were made at independence, even from these models.

Next to the founders of this epoch of scientific anatomy should be mentioned the Leyden anatomist Eduard Sandifort, although his works

dealt chiefly with pathologic anatomy. His valuable engravings of the duodenum, however, and the reproductions of skulls contained in his description of the Leyden Museum, should not be passed over. In the same class with the latter are the reproductions of skulls by his son Gerard Sandifort (1838) and Blumenbach's reproductions of seventy-five life-sized skulls (*Collectio craniorum diversarum gentium illustrata.* Göttingae, 1790–1828, 4°).[1]

There remained only the anatomy of the lymphatics, which, though it had been repeatedly dealt with since Aselli, had never been extensively treated, and which was in need of an exclusive and thoroughgoing monograph to equal the great works on blood vessels and nerves. Anatomic science was given such a monograph by the Italian Paolo Mascagni (1787), who was also the author of the attempt to reproduce in life-size figures the entire anatomy of man in all its details, which first became known long after his death. This attempt is admired rather for its audacity of conception and for the endurance required for the necessary efforts and labor than for any essential progress it introduced in the study of anatomy, or for any permanent influence wrought upon anatomic representations.

The needs of the student were hard to meet during this period, since copperplate engraving, now the only customary means of reproduction, made books expensive, and since, in relation to the high level attained by anatomic science, a meager selection of small drawings no longer sufficed for a thorough training. For this reason most of the best textbooks of the time contain no illustrations. In Germany the two following collections were preferably used by students:

The Leipzig professor Karl Gottlob Kühn, though himself not a professional anatomist, revised an edition of the already-mentioned antiquated tables of Kulmus with entirely new copper engravings: *Johann Adam Kulmus: Anatomische Tabellen*, revised by K. G. Kühn, with 27 new copperplates, Leipzig, 1789, 8°; New edition: Leipzig, 1814, 8°.

The Berlin professor Johann Christoph Andreas Maier published a textbook of anatomy with copperplates, which treats of the various principles of this science in separate books (1777). The copperplates belonging to these books were published together as an anatomic atlas under the separate title: *Johann Christoph Andreas Maier: Anatomische Kupfertafeln nebst dazu gehöriger Erklärung*, Berlin, 1783–94, large 4°.

[1] Six complete decades and half of the seventh of Blumenbach's *Collectio craniorum* were published under the title: *Nova pentas collectionis craniorum*, Göttingae, 1828, 4°; representing altogether only sixty-five skulls.

Much more important and extensive, and also more expensive, are the two large collective works by Loder (1794), and by the two Caldani (1801), which give in good reproductions a useful selection of the very best engravings that had been published up to that date (pp. 325, 327 ff.).

With these two works, which repeated the best that had been offered up to this time, in as far as it was still of use and had not yet been replaced by something better, this period of scientific anatomy ends, giving place to a new epoch in which the means of reproduction are multiplied by the introduction of lithography, steel engraving, the daguerreotype, the perfected woodcut, and others, and in which the needs of anatomic representation are enlarged through histologic and microscopic anatomy. It is an epoch which is not yet ripe for a historical presentation and one which, moreover, is not yet concluded.

ANATOMIC ILLUSTRATIONS OF ANTIQUITY AND OF THE MIDDLE AGES[1]

Hardly any anatomic illustrations have come to us from ancient times, although some such may have existed. Aristotle in his history of the animal world, and also in other places, expressly refers to them, as παραδείγματα, σχήματα, διαγραφή (*de generat. animal.* i. 7; *histor. animal.* ed. Schneider i. 14, *alias* 17 et 24, ii. 13, *al.* iii. 1). It may be, however, that those *paradigmata* represented parts of animal bodies only, for Aristotle could hardly have dissected human bodies, since he confesses himself that the internal parts of the human body were unknown to him, and that he was compelled to utilize animals whose structure was similar to that of the human body (*histor. animal.*, ed. Schneider, i. 13, *alias* 16, 17). Only in the Alexandrian school, and then only in the beginning under Herophilus and Erasistratus, did they dissect human bodies. Galen, also, had no occasion to do any dissecting and refers, for the study of osteology, to Alexandria, where they perhaps still had at least one skeleton. Nor did Roman physicians dissect any human bodies either.

The vignette in Johann Friedrich Blumenbach's *Geschichte und Beschreibung der Knochen des menschlichen Körpers*, Göttingen, 1786, 12°, represents a bearded old man, clothed and seated, holding an upright skeleton before him by its left hand. On the right side of the skeleton we see a flying genius with a torch; behind the old man stands a clothed female figure. This picture, an alleged copy of an old cornalian (see Lippert: *Daktyliothek*, Supplement, Part 11, no. 150, page 131), permits in the first place the suggestion of anatomic instruction, although it may also be interpreted to represent the formation of man by Prometheus (Olfers, page 40).

Again, during the better periods of ancient art, and up to the time of its decline, we find figurations of skeletons and shriveled bodies covered with skin (*lemures*) in bas-reliefs, as well as on cameos and in bronze. These representations, however, never served the purpose of anatomic instruction, but are rather of an emblematic nature, i.e., they are sometimes symbols of death, or figurative incitements to enjoy life considering

[1] This section is supplemented by additions and also by the succeeding chapter which has been inserted and which contains a paraphrase of the highly original MS investigations on the sources of early anatomic illustrations by Professor Karl Sudhoff. Bracketed portions of the text are by the translator.

its mortality; sometimes they refer to the fable of Prometheus, and sometimes they are magic amulets. They have, therefore, just as little to do with our discussion as the ancient works of art representing the fable of Marsyas which, some thought, were intended as myologic models for artists. In saying this, we do not mean to deny the fact that they may oftentimes have been used by physicians and artists as means of self-instruction.

[For the representation of the skeleton on antique sculptures compare Lessing's *Wie die Alten den Tod gebildet*, in Lachmann's edition of his works, VIII, figure 210, and Göschen's edition, V, figure 272. An index to representations of such sculpture may be found in: Ignaz Franz Maria von Olfers' book: *Ueber ein Grab bei Kumä und die in demselben enthaltenen merkwürdigen Bildwerke, mit Rücksicht auf das Vorkommen von Skeleten unter den Antiken.* With 5 lithographic plates, Berlin, 1831, 4°, pages 29–45. ("On a grave near Cumae and remarkable sculpture found in it, with a consideration of the occurrence of skeletons in antique art.")]

In the editions of Moschion: *De mulierum passionibus* we find, in chapter vi, a reproduction from the manuscripts of the uterus with the ovaries, which are indicated by letters in the text. This illustration has been incorporated with the editions and translations of Moschion into the *Gynaecia* and other later works, and can also be found on the last plate of Vesalius' *Epitome*, figure 6. In Dowez's edition of Moschion (Vienna, 1893, 8°), we find it on pages 4 and 115. See also Peter Lambeck: *Commentaria de augustissima bibliotheca Caesarea Vindob.* Vind., 1674, fol., p. 134.

In Johann Stephan Bernard's edition of the *Introductio anatomica, Gr. et Lat.*, by an unnamed author of the fourth or fifth century (Lugd. Bat., 1744, 8°) we find, following page 158, two reproductions of a naked body seen from the front and back, and of a human head; everything being marked with letters for purposes of explanation. The explanations are given in Greek on the opposite pages. The reproductions are taken from a Leyden MS of indefinite date, and are otherwise mere linear drawings of the external parts, in not very beautiful proportions. Other editions of the *Introductio anatomica* do not contain these figures.

All these drawings probably belong to the Middle Ages, and there may yet be other manuscripts containing anatomic illustrations.[1] Henri de Mondeville (Hermondavilla), a physician of the fourteenth century [according to a report originating with Guy de Chauliac] taught human

[1] For the highly important investigations on medieval anatomic MS illustrations by Karl Sudhoff, see p. 49.

anatomy with the aid of thirteen illustrations.[1] (See Haller, I, 145.) [The passage making this statement is in the older edition of Guy de Chauliac's *Chirurgia* (in the *Collectio chirurgia Veneta: Venetiis, expensis Octaviani Scoti, arte Boneti Locatelli, 1498, XI. calend. Decembr. fol.*), *tractat. I. de anatomia, doctr. 1. cap. 1*, and reads as follows:

Experimur etiam in corporibus desiccatis ad solem aut consumptis in terram: aut eliquatis in aqua currente: aut bulliente anatomiam saltem ossium, cartilaginum iuncturarum neruorum grossorum, thenantum et colligationum. Et per istos modos in corporibus hominum asinorum et porcorum atque aliorum multorum animalium ad noticiam pervenitur anatomie: et per alias picturas, sicut fecit Henricus praedictus qui cum 13 picturis visus est anatomiam demonstrare.

"We learn also in the case of bodies which have been dried up in the sun, rotted in the earth, or macerated in running or boiling water, the anatomy at least of the bones, the cartilages, the joints, the large nerves, the tendons, and the ligaments of these. And by such methods, in the bodies of men, asses, pigs, and many other animals, we arrive at a knowledge of anatomy. Then too there is the use of pictures, as was the method of the aforesaid Henricus, who professed to demonstrate the science of anatomy with thirteen illustrations."

In a revision of Chauliac's text undertaken by Laurent Joubert (Lugd. 1585, 4° in offic. Tinghi Florentini) to improve its latinity, but abounding in arbitrary changes, the last lines of this passage read:

Et per istos modos in corporibus hominum, simiarum, at porcorum, atque aliorum multorum animalium, ad notitiam peruenitur anatomiae: et non per picturas, sicut fecit Henricus praedictus, qui cum tredecim picturis visus est anatomiam demonstrare (page 21),

"And by such methods on the bodies of men, apes, pigs, and many other animals, we arrive at a knowledge of anatomy, not through the use of pictures, the method of the aforesaid Henricus, who professed to demonstrate anatomy with thirteen illustrations,"

completely changing the meaning, but reiterating the fact that de Mondeville taught anatomy by means of pictures. This he must have done toward the end of the thirteenth, or during the first half of the fourteenth century, that is to say, with the aid of sketches which, however, had not as yet been unearthed.[2] Laurent Joubert, as well as Chauliac himself, was an instructor at Montpellier (b. 1529, d. 1582) and might have followed old manuscripts and traditions in making these changes.

Henri de Mondeville, Henricus de Hermondavilla, also mentioned under the names of Henricus de Mondavilla, H. a. Mondavilla (and not to be confused with Sir John Mandeville, the famous traveler of the

[1] All these have been worked out by Sudhoff, especially de Mondeville, see p. 49 *et seq.*

[2] These were later found by Sudhoff in a MS in the Bibliothèque Nationale at Paris and in another MS in the Royal Library at Berlin. See p. 49 *et seq.*

fourteenth century), was a physician and chief surgeon at the court of King Philip the Fair of France (reigned from 1285–1314), and later lived as a physician in Paris. He is mentioned as a pupil of Jean Pitard and the teacher of Guy de Chauliac and is frequently quoted in the latter's *Chirurgia*. It is often said that he was an instructor at Montpellier, but this is hardly so since neither in Jean Astruc's *Mémoires pour servir à l'histoire de la faculté de médecine de Montpellier*, Paris, 1767, 4°, nor in the writings on this school by Ranchin and Pellissier, appended to Astruc's work, is there any mention made of him. On the other hand Gabriel Naudé: *De antiquitate et dignitate scholae medicae Parisiensis panegyris*, Lutet. Paris. 1628, 12°, speaks of him (on pages 41 and 76) as an ornament to the faculty in Paris and referring to him under the name of Henricus de Hermondauilla or Hermundauilla, calls him body physician to the king. There is nothing of his work in print, but several of his manuscripts are said to be in existence.[1] His theories were those of Guilelmus de Saliceto, and he endeavored to combine with them the theories of Theodoric of Cervia and Lanfranc. Haller: *Bibl. anat.* I, 145; *Chirurg.* I, 152, 154; *Med. pract.* I, 438. Haeser: *Geschichte der Medicin*, edition 2, pp. 338, 346.]

A beautiful old parchment MS codex of the Dresden Royal Library (*Galeni opera varia latine, interprete Nicolao de Regio*, D, 92, 93, fol. maj., 617 pages in two volumes) written in Belgium, probably in Brussels, at the beginning of the fifteenth century, contains initials with very neatly executed miniatures in gold and opaque colors.[2] These miniatures represent features of medical teaching and practice, and refer to the accompanying text. They are very illuminative for the costumes and customs of the times. Generally they show a teacher sitting or standing, with

[1] These have since been edited and printed from the several manuscripts by Nicaise and Pagel.

Pagel (Julius Leopold): *Die Anatomie des Heinrich von Mondeville. Nach einer Handschrift der königlichen Bibliothek zu Berlin vom Jahre 1304, zum ersten Male herausgegeben*, Berlin, 1889, 8°.

———: *Die Chirurgie des Heinrich von Mondeville (Hermondaville) nach dem Berliner und drei Pariser Codices zum ersten Male herausgegeben, Archiv für klin. Chir.*, Berlin, XI (1890), 253–904.

———: *Leben, Lehre und Leistungen des Heinrich von Mondeville (Hermondaville). Ein Beitrag zur Geschichte der Anatomie und Chirurgie*, Part I. Berlin., 1892, 8°.

Nicaise (Édouard): *Chirurgie de Maître Henri de Mondeville, chirurgien de Philippe le Bel, roi de France, composée de 1306 à 1320. Traduction française, avec des notes, une introduction et une biographie, publiée sous les auspices du Ministère de l'instruction publique par E. Nicaise avec la collaboration du Dr. Saint-Larger et de F. Chavannes*, Paris, 1893, roy. 8°.

[2] These miniatures are reproduced by E. C. van Leersum and W. Martin in *Miniature der lateinischen Galenos-Handschrift* (etc.) fol., Leyden, 1910.

covered head, and two or three students, always uncovered, to whom the matters shown are demonstrated. To the anatomic and physiologic parts of the book belong, among others, the following illustrations: page 19b, a naked man with his cardiac cavity laid open, showing the red heart lying exactly in the median line of the body; below this, a suggestion of the liver and the stomach. A similar representation can be seen on page 96b; here, however, the opening cut into the body is smaller. On page 26b, are Aristotle and Galen, the latter holding in his left hand a heart shaped like the heart in a pack of playing cards; page 34b, an instructor, seated, feels with the thumb of his left hand, the right pulse of a naked man standing in front of him; page 50, a naked woman; page 59,

a naked man and several animals. Page 75b, a man standing on a cushion, the upper part of his body dressed, his lower extremities bare. Page 83b, a naked man, pointing to the approximate position of the larynx with his left hand. Page 109, a naked man whose chest, from the neck down, has been cut open in such a manner as to show the trachea and the red heart in the cardiac region, shaped like the heart in cards. Page 151, a naked man seen from the back. Page 158, a naked pregnant woman with long golden hair reaching down below the upper part of the thighs. A similar representation is found on page 295b. Page 164b, a clothed man with his genitals exposed and erected. Page 304, a man holding with his left hand the right hand of a woman standing beside him, both naked, the man's skin being darker. The second volume contains illustrations which are concerned almost entirely with diseases and medicines.

¶ Cap. primum de modo emissionis spermatis feminei ad matricem:

Onsequenter q̄ dicendū est de spermate femine quam in principio libri dicere differebamus. ¶ Primum autem erit horum ea que per anathomiam evidenter apparent. Ad iacet quidem quedā testicu

Among them we find, curiously enough, pictures of a bathing scene, a garden of medicinal herbs, a display of herbs, a pharmacy, a lecture, the beadle with his staff, various sick people in and out of bed, a snake-charmer, and many more scenes. The opening of a dead body is not found anywhere in the manuscript, but as this particular scene frequently occurs on the title-pages of books of the fifteenth and sixteenth centuries, it seems probable that it was also brought out in earlier manuscripts. Our public inquiry on this fact has thus far remained unanswered. Likewise there is no skeleton in this manuscript nor any anatomic representation of other internal parts than those mentioned.

On account of their purely emblematic nature, we had to leave out of our discussion the dances of death (*Danses macâbres*), symbols of Death's power over human ambitions and relations, although in these illustrations, skeletons appear in a great variety of movements, with their bones still connected by ligaments, often even with the skin and internal organs still visible. We, nevertheless, hasten to admit that these representations give proof, on the one hand, of the anatomic knowledge of the artists of those days, though, on the other hand, they might have served the artists as anatomic studies. Their period of sway most likely began in the fifteenth century, but did not reach their climax until the time of Hans Holbein the Younger, who died in London in 1554. They remained in fashion all through the sixteenth century.

Von Olfers, Ignatz Franz Maria: *Über ein Grab bei Kumä und die in demselben enthaltenen merkwürdigen Bildwerke, mit Rücksicht auf das Vorkommen von Skeleten unter den Antiken*, with 5 lithographs; Berlin, 1831, 4°. (On p. 30 *et seq.* is found an enumeration of pictures, skeletons, etc., among the ancients.)

Blumenbach, Johann Friedrich: *De veterum artificum anatomicae peritiae laude limitanda, celebranda vero eorum in charactere gentilitio experimendo accuratione*, Göttingen, 1828, 4°, with illustrations. (Also in *Comm. soc. Götting.;* A reply to Hirt on the representation of the nude among the ancients in the manuscripts of the Berlin Academy.)

Welcker, Friedrich Gottlieb: *Zu den Alterthümern der Heilkunde bei den Griechen* (extracted from his Kleine Schriften, III), Bonn, 1850, 8°, with 1 illustration.

Schulze, Johann Heinrich: *Historiae anatomicae specim.* II. Altdorf, 1723, 4° (*in Kurella fasciculus dissertationum ad historiam medicam speciatim anatomes spectantium*, Berlin, 1745, 8°, p. 450)—*Ejusd. historia medicinae.* Leipzig, 1728, 4° (p. 357).

Ebert, Friederich Adolf: *Geschichte und Beschreibung der Königl. öffentl. Bibliothek zu Dresden*, Leipzig, 1822, 8° (p. 261).

Falkenstein, Karl: *Beschreibung d. K. öffentlichen Bibliothek zu Dresden;* Dresden, 1839, 8° (p. 243).

Peignot, Gabriel: *Recherches historiques et litteraires sur les danses des morts et sur l'origine des cartes à jouer*, Dijon, 1826, 8°, with illustrations.

Douce, Francis: *The Dance of Death*, London, 1833, 8°, with illustrations.

Massmann, Hans Ferdinand: *Litteratur derTodtentänze*, Leipzig, 1840.

MANUSCRIPT ANATOMIC ILLUSTRATION OF THE PRE-VESALIAN PERIOD

A: DRAWINGS SHOWING INFLUENCE OF TRADITION UPON EARLY ANATOMIC ILLUSTRATION

By

Mortimer Frank, M.D.

The pursuit of medicine from the historical standpoint and its recognition as a worthy field of research has resulted in the foundation of the *Institut für Geschichte der Medizin* at Leipzig, under the direction of Professor Karl Sudhoff, and the establishment of a special chair on the subject at the University of Leipzig in the same year (1905). The Institute and its publications, the *Archiv für Geschichte der Medizin* and the *Studien für Geschichte der Medizin* are supported by a special endowment, and with ample financial resources at his command, Professor Sudhoff travels extensively in search of rare and important medical MSS stored in the European libraries, monasteries, castles, and in other public and private collections.

A rich series of these MSS has been resurrected by him, and by photographing and collating them he has brought out many new facts which have thrown a flood of light on the sources of early anatomic illustrations. In this manner a genetic connection has been established between some of them and the earliest printed anatomical figures. He has been followed in this work by Charles Singer, of Oxford, England. In his study of printed pictorial representations of anatomy before Vesalius, Sudhoff has shown that none of these crude sketches were based upon actual dissections or original observations, but upon earlier traditional diagrams. In this section, revised by himself (1920), his findings have been closely followed, as being perhaps the best way to emphasize the importance of his work.[1]

The medieval illustrators made a series of five schematic pictures (*Fünfbilderserie*), invariably in a squatting posture, representing the osseous, nervous, muscular, venous, and arterial systems, to which was

[1] See Sudhoff: *Tradition und Naturbeobachtung in den Illustrationen medizinischer Handschriften und Frühdrucke vornehmlich des 15. Jahrhunderts*, Leipzig, 1907, and *Ein Beitrag zur Geschichte der Anatomie im Mittelalter*, Leipzig, 1908; also Sudhoff's *Archiv*, Leipzig, 1907–16, I–IX, *passim*. Professor Sudhoff had originally proposed to write this section for the translator, but this was unfortunately prevented by the war.

sometimes added a sixth, the pregnant woman, or a view of either the male or female generative organs. This group of five schematic anatomic drawings was first studied by Sudhoff in two Bavarian MSS with Latin texts, one drawn in the year 1158, in the cloister of Prüfening near Ratisbon, and the other drawn about the year 1250 in the cloister of Scheyern. The two series showed such evident conformity that one is compelled to assume a very close relationship between them. That the Latin codex of Prüfening (Munich, 13002) served as a model for the Scheyern monk Konrad in the execution of his anatomic drawings (Munich, 17403), Sudhoff did not doubt at the time, and this assumption has been proved by his later investigations of other medieval anatomic MSS in Germany, in the Bodleian and Ashmolean libraries at Oxford, in the British Museum at London, in the Bibliothèque Nationale at Paris, in a Persian MS in the India Office, London, in a parchment MS at Stockholm (Royal Library), and in many others. He is convinced that these drawings and texts, and those investigated later, descended from antiquity directly or indirectly from a common model.

Examination of a Provençal MS of the thirteenth century (about 1250) in the Basel University Library (D. II. 11) with five anatomic pictures has led Sudhoff to believe that the Provençal text was a combination of two distinct compilations of the eleventh and twelfth centuries, both deriving from the antique. He is of opinion that it was translated from the Latin and that there may still be a French version in existence by comparison with a similar text in the Bibliothèque Nationale at Paris.

While the external execution of the anatomic figures is different from those of the Prüfening-Scheyern series, the position of all the Basel pictures agrees with them, with the exception of that of the female genitals. Presumably from the modest need of a certain sense of propriety the legs of the nude woman are hardly spread apart and the external genitals are left undrawn. The representation of the generative organs of both sexes is newly introduced here, but the muscle and nerve illustrations are missing. Only the skeleton picture contains an explanatory text but does not agree with the Prüfening-Scheyern skeleton diagram.

The spleen is shown in the protracted shoe-sole shape as seen in the descriptive paintings and illustrations of the Middle Ages, and found later, in 1499, in the work of Johannes Peyligk.

Of great interest is the picture of the uterus on the female anatomic plate. For the first time in a MS drawing it is shown with six chambers

or cells and a suggestion of a seventh; i.e., the prototype of the seven cells of Magnus Hundt's *Figura matricis* which for a long time perplexed all historians of anatomy. The majority of medieval gynecological writers following Soranus, or rather his Latin interpreter Moschion, described the uterus as having seven cells or chambers. Mundinus has been given the credit as the source from which Hundt got his information, but Sudhoff does not believe that it was original with Mundinus but that he followed his great predecessors, especially Galen, to whom may be traced this drawing of the uterus. The text of the Provençal *Anothomya* conforms entirely to this picture.

Although the connection is not very close, Sudhoff does not doubt that there exists a connection between the Prüfening-Scheyern and the Provençal series in Basel. Springing perhaps from the same root, they followed separate developments at an early stage which led to manifold differentiation. The pictures from the Prüfening-Scheyern and the Oxford series are closely related; they descended from antiquity and were transmitted via Byzantium. The Provençal-Basel series likewise descended from antiquity but they probably passed through an entirely different line of transmission. That the two illustrated anatomic treatises from the upper valley of the Danube did not stand absolutely alone was again established in the Oxford Ashmolean MS 339, of the year 1292. Using the parallel texts and examining them thoroughly, Sudhoff believes them to be free from Arabic or Arabist influences.

In the Dresden Codex C. 310 (1323 A.D.), the five anatomic pictures are missing but the text corresponds almost in its entirety, except for that of the muscles, with the two Bavarian cloister MSS which the monks of the Danube Valley copied almost two hundred years before. This MS, however, contains a drawing of a skeleton which will be discussed later.

In a fourteenth-century MS (VI, Fc, 29), in the library of Prince von Lobkowitz (Raudnitz, Bohemia), the traditional development of the five-picture series was still further investigated and also an attempt made at the reconstruction of the Latin text. Comparison was made with the text and drawings of the cloisters of Prüfening and Scheyern, and the Oxford MS (399) of the Ashmolean Library. The execution is later than those just quoted but the text came from good sources as well as the illustrations which, in some respects, excel all the others as regards the coloring of the organs. The colors likewise recur in the Persian pictures. The position of all the figures is the same bent-knee, squatting posture as on all the other known series. That a predecessor of the arterial picture once showed the kidneys, seems to be proved by

two peculiar club-shaped coils, in the right left hypogastrium which the illustrator mistook for coils of blood vessels. The Prüfening and Scheyern drawing is entirely without the kidneys. This picture of the Raudnitz series unwittingly preserved a detail that two hundred and fifty years before had entirely disappeared in another good line of tradition. Noteworthy in this study are the feather-like figurations at the ends of the vessels of the artery picture, which so far have only been found on the Persian series. The same feather-like detail on the nerves of the lower extremities in the Prüfening-Scheyern pictures and also on the Oxford artery and vein drawings are undoubtedly old artistic property designed to suggest the minute branchings of blood vessels.

Another noteworthy line of tradition is shown on the Raudnitz vein drawing. This consists of a venous network, of the arachnoidea, on the crown of the head of the Raudnitz picture and described in the MS text. In the Prüfening-Scheyern series this is suggested and also in two Oxford pictures (the Ashmolean 399 and Codex e Musea 19). The skeleton drawing of the Raudnitz MS agrees in nearly all details with those in the MSS mentioned in the foregoing sentence. The Raudnitz skeleton drawing has added, however, the separate representation of the teeth. The triangular figure on the forehead occurs likewise on the Prüfening, Scheyern, and Oxford (Ashmolean) series. With the exception of the drawing of the spinal nerves the rest of the Raudnitz nerve picture agrees with that of the other MS series. The Raudnitz drawing shows distinctly the arrangement of the two nerve roots standing out to the right and left between the vertebrae, which is not shown in the other nerve series. The Raudnitz drawing has obviously preserved in this respect an old detail that had long disappeared from all the other pictures.

Considerable uniformity exists among all four myologic pictures. In describing the Raudnitz MS, with its noteworthy legends, Sudhoff concludes with an attempt at a reconstruction of a text and legends from all the MSS he has thus far investigated.

In the Ashmolean Codex (399) of the Bodleian Library, which Sudhoff used in connection with the reconstruction of the text, the posture of all the figures in the drawings is almost the same as in the Raudnitz, except that these Oxford figures are a little less bent in the knees, i.e., the squatting position has disappeared somewhat. The legends are entirely missing. The five-lobed liver and sole-shaped spleen show nothing peculiar, except perhaps the centrally located elliptical gall bladder. Viewed as a whole, this series offers nothing new, but its value lies in a renewed authentication of the total material of the five-picture series

with all its peculiarities, and in the new confirmation coming from another sphere of civilization. The pictures, Sudhoff says, were drawn in England and the text copied there toward the end of the thirteenth century. This MS contains other anatomic material of extreme rarity and value which, up to the time of Sudhoff's studies, was wholly unknown and whose tradition is extremely limited. None are provided with legends. As chance would have it, a single loose sheet with anatomic outline sketches fell into Sudhoff's hands in Pisa. This agrees completely with the pictures of the organs shown in the Ashmolean codex (399), and all are provided with elaborate explanatory inscriptions. Judging from the handwriting, the date of the plate can be placed within the first half of the thirteenth century. The drawings on the Pisa sheet consist of the stomach, with the oesophagus and intestines, next the gall bladder, and below it the shoe-sole spleen; then follow two sketches of the heart, a five-lobed liver of Galenic origin, while below these a larger drawing of the liver is shown, with six lobes, and at the top the gall bladder. The remaining pictures represent a diagram of the eye, nose, and brain, and below the reproductive organs.

The drawings of the Ashmolean MS are nearly identical with those just described, but more finished and on a large scale. The exceptions are, only one sketch of the heart; the diagram of the nose, throat, and brain has changed into a full-paged illustration; the Pisa diagram of the intestines is replaced by a drawing of a bundle of gut and a picture of two kidneys, which has no corresponding sketch on the Pisa plate. Although the pictures are coarsely and crudely drawn, nevertheless, they show the anatomic conceptions of the early Middle Ages, which probably descended graphically from antiquity through Alexandrian times. Especially interesting are the drawings of the liver and the pear-shaped gall bladder, as well as the spleen of both anatomic plates, which are identical with the five-lobed liver and shoe-sole-shaped spleen drawings of the twelfth-century Prüfening-Scheyern MSS of the five-picture series. Another point of resemblance between the five-picture series and the sketches of the viscera is the drawing of the heart with the lungs as a hazelnut-shaped cover. Nor can the close connection between the drawing of the situation of the intestines of the Pisa sheet and the Prüfening-Scheyern series be denied. Sudhoff is inclined to attach a high traditional value to the Pisa plate in its relation to the early five-picture series. He believes that crude sketches of this Pisa plate clung most faithfully to the then oldest form of tradition and give the Prüfening-Scheyern pictures a new, firm support. This whole series of pictures

of the organs is an independent mass of traditional material and did not come about by selective copying process from the five-series pictures, for it possesses too many individual features. But the fact that all the five-series pictures agree with the corresponding series of organs proves a traditional relationship between the two, and each may have been produced in their time near the mouth of the Nile.

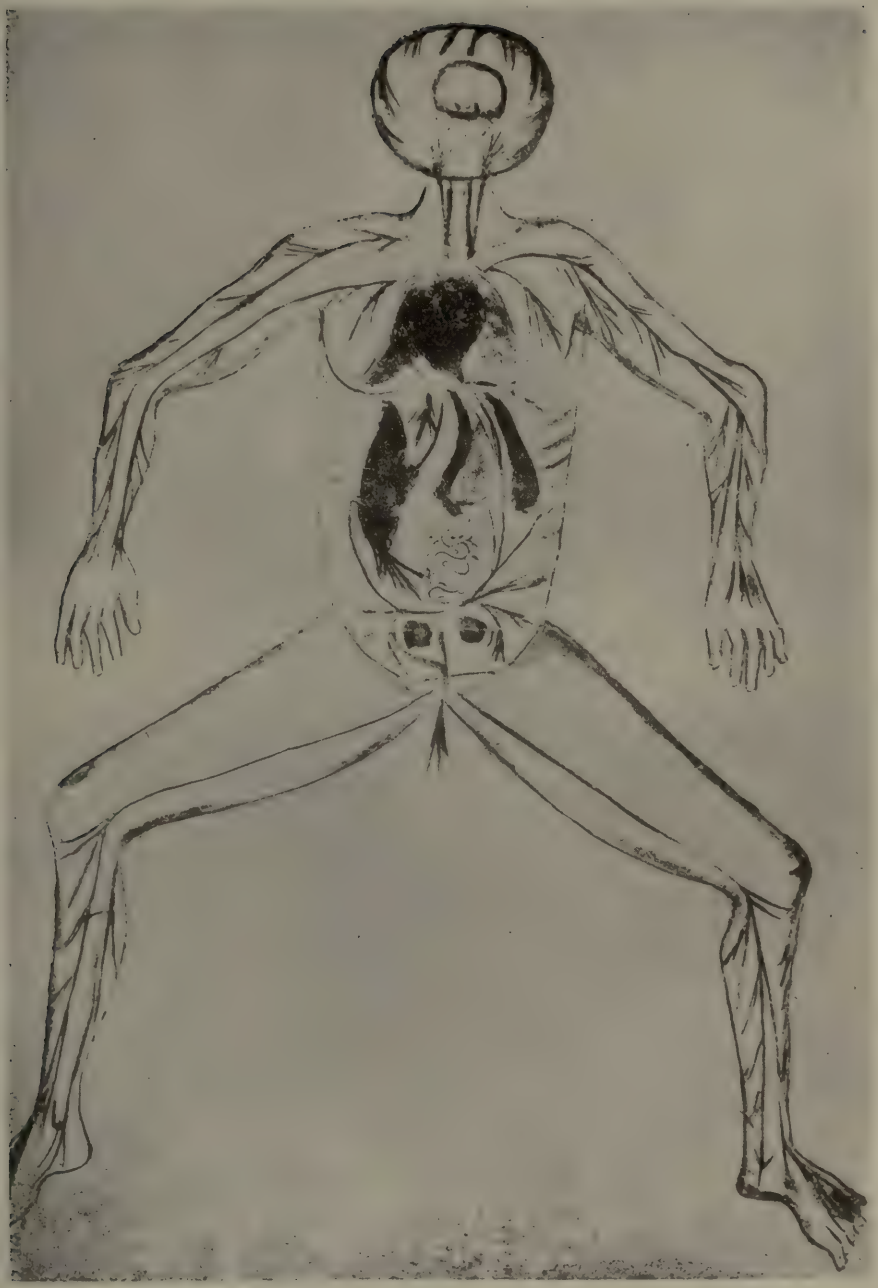
As part of the anatomical tradition of the Far East, Sudhoff has studied four MSS of a Persian series,[1] with the five schematic pictures, which in a systematic manner represent the bones, nerves, muscles, veins, and arteries of the human body.

Three of these Persian picture series are provided with the same Latin text which Sudhoff once before had independently established on only the skeleton picture (Dresden Codex 310, 1323 A.D.). On the other hand, the entire drawing of this Dresden skeleton shows that the more original forms had been adhered to and that this picture, even at an early date, had deviated from the traditional line. The traditions which have been preserved in the Prüfening picture cycle (Munich Codex, Latin, 13002, 1158 A.D.), in the Scheyern cycle (Munich Codex, Latin 17403, about 1250 A.D.), in the older Oxford cycle (Ashmolean Codex, 399, about 1292 A.D.), which was drawn in England and which therefore presupposes an older illustrated text brought into England from Italy or southern France, and finally in the later Oxford cycle (Codex 19, Bodleian, about 1340 A.D.), which represents only the beginning of a copy of this picture cycle, will, Sudhoff believes, probably find their supplements in Italian libraries.

It may be asserted with almost historic perspicuity, that these pictures with their text must have been based on a short illustrated Alexandrian textbook of anatomy, which was written in Greek and provided with schematic drawings done probably after representations then extant. The Latin text is entirely free from Arabic influences and therefore comes directly by occidental tradition from antiquity. This text, with its illustrations, was, of course, known also to the Arabians but as the anatomic drawings could not be transmitted for religious reasons, it is difficult to find the text; however, Sudhoff is of the opinion that this will yet be accomplished.

From the Latin text of this anatomic picture series it may be inferred that there were originally nine schematic pictures. A thirteenth-century

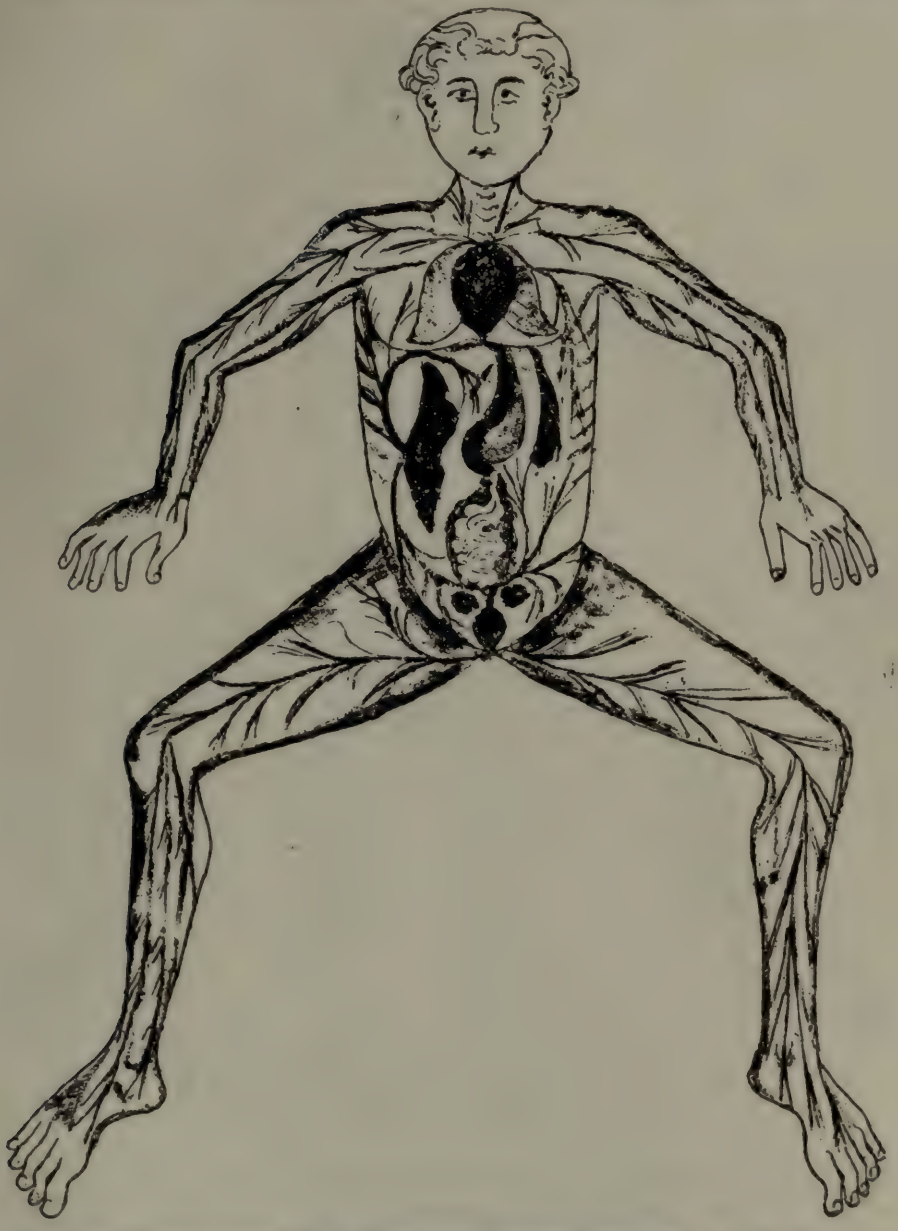
[1] Codex 19 Bodleian Library at Oxford (1400 A.D.), no legends. MS 23556 (Bibl. Taylor) British Museum, London (before 1400 A.D.). MS 1555 Bibliothèque Nationale, Paris (before 1400 A.D.). India Office, London.



VENOUS SYSTEM, FROM A LATE THIRTEENTH-CENTURY PROVENÇAL MS (D. II. 11.) IN THE BASEL UNIVERSITY LIBRARY

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate II)

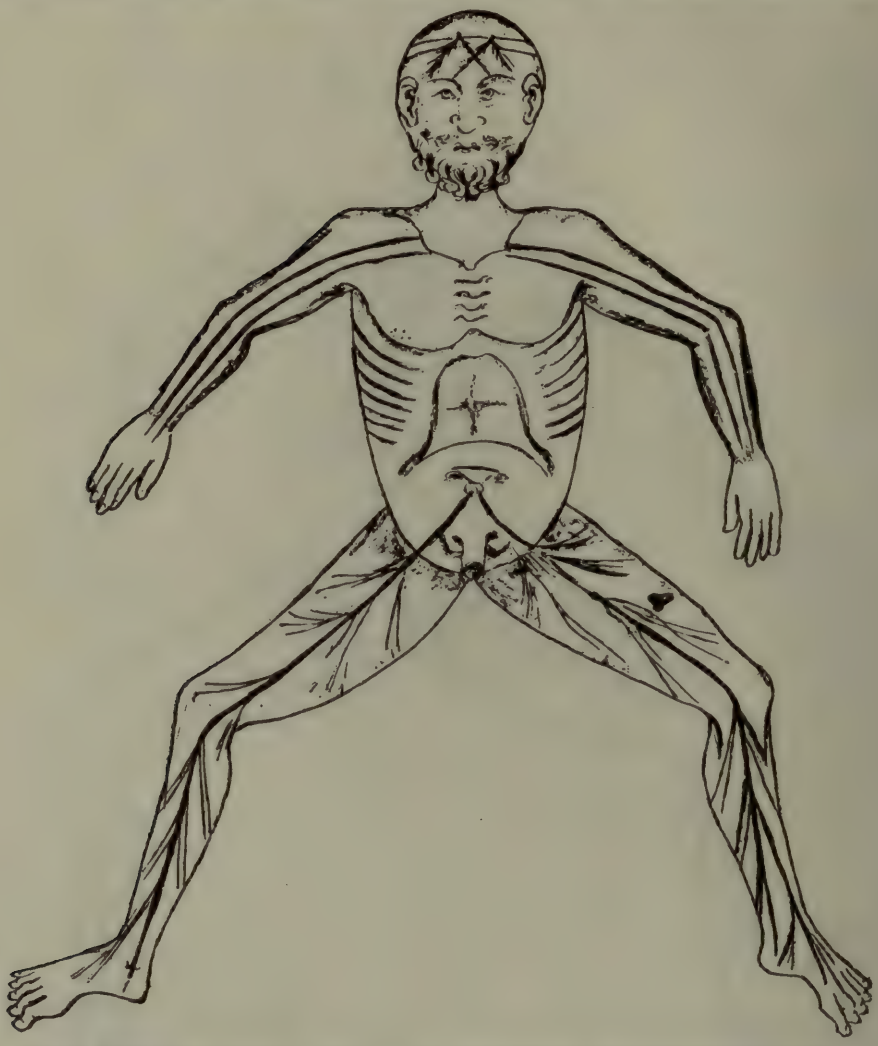
Provençal MS at Basel (D, II, 11, about 1250) presents, simultaneously with the Scheyern series, the arterial and venous illustrations of the anatomic series of Alexandria, without text, and two other drawings, one



ARTERIAL SYSTEM, FROM A LATE THIRTEENTH-CENTURY PROVENÇAL MS (D. II. 11.) IN THE BASEL UNIVERSITY LIBRARY

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate V)

of the female and the other of the male generative organs, which in this manner had never before been met with except in this Basel-Provençal MS: a nude man with a vascular system for the demonstration of the



Male Generative System, from a Late Thirteenth-Century Provençal MS (D. II. 11.) in the Basel University Library

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate IV)

synthesis of spermatozoa from all the body humors, and a nude woman with the same drawing of the vascular system, but without the blood vessels of the forehead, liver, seven-celled uterus, and with thighs modestly placed together.

The Provençal MS of Basel, however, has a fifth drawing that does not belong to the Prüfening-Scheyern series. This is the Basel skeleton which was found almost at the same time in a Munich Codex

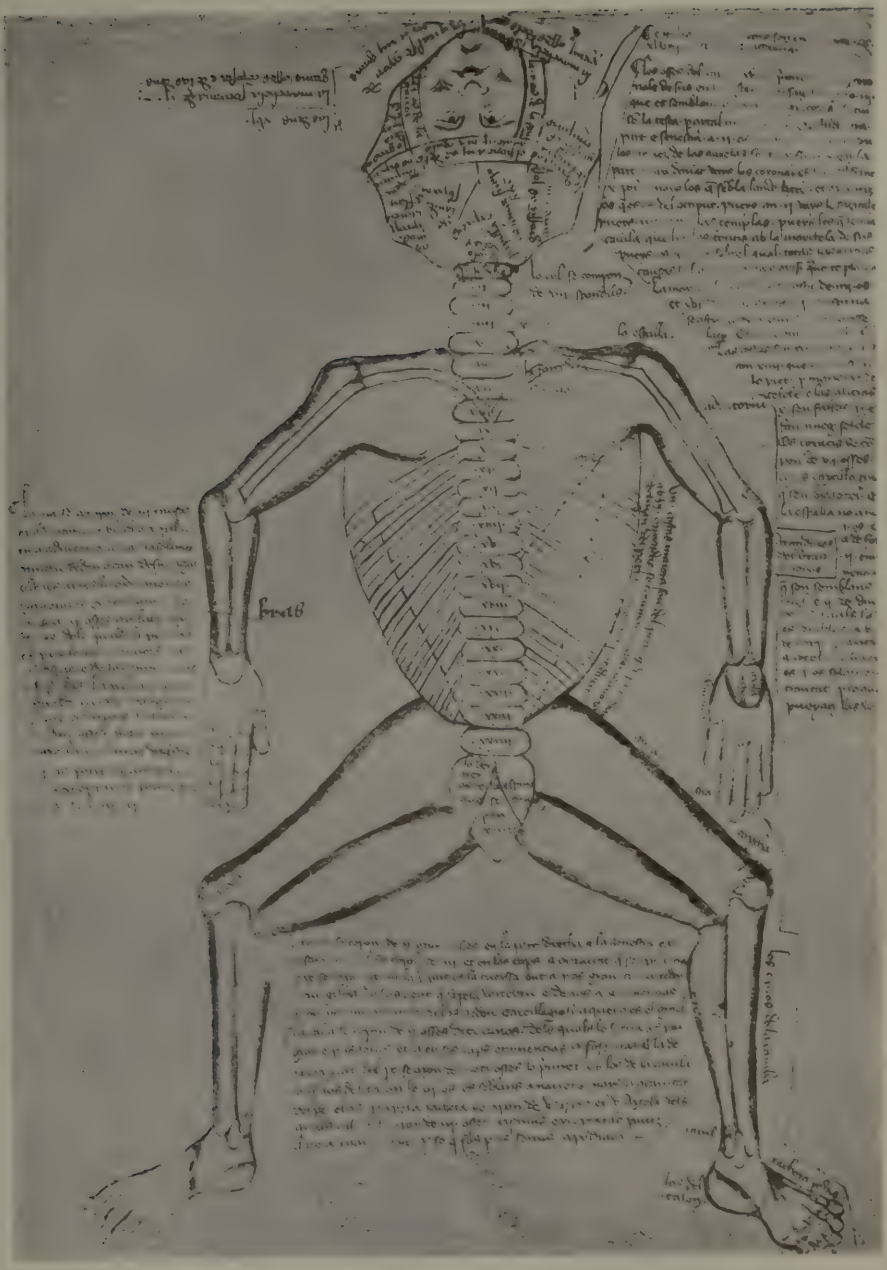
FEMALE GENERATIVE SYSTEM, FROM A LATE THIRTEENTH-CENTURY PROVENÇAL MS (D. II. 11.) IN THE BASEL UNIVERSITY LIBRARY

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate III)

(*Codex monacensis latinus* 13042). This representation of the osseous system, viewed from the back, belonged definitely to another series of which only this one, it now appears, has come down through occidental tradition via Provence or Italy while the entire series has also come down to us in Persian tradition and, as Sudhoff has proved, in a rather large number of MSS.

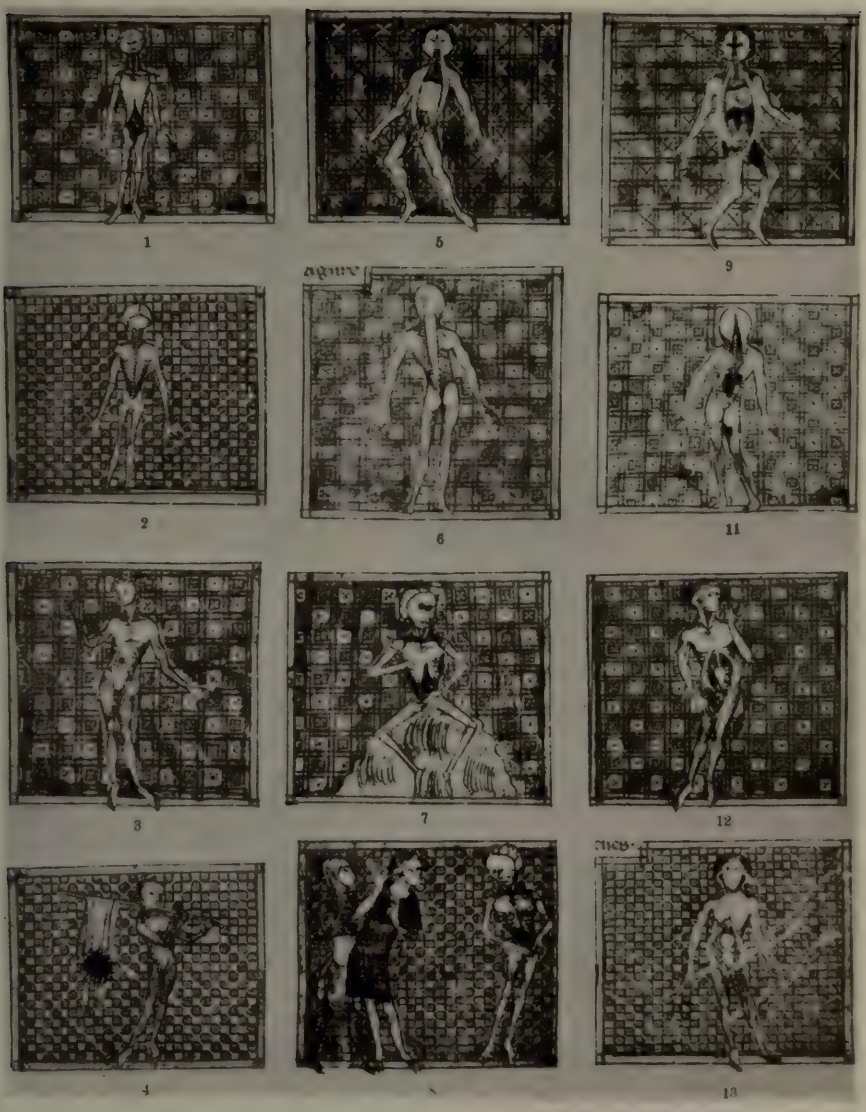
The orthodox branch of Islam to which all the Arabic medical authors subscribe, that of the Sunnites, made it impossible to preserve the Alexandrian anatomic drawings, which these authors also undoubtedly knew, and to hand them down to us through copies. With the more liberal school of the Persian Shiites, the drawing of a human figure, and therefore anatomic drawings, was not altogether impossible. However these pictures, for instance, the drawing of the liver, may differ from the other lines of tradition, they nevertheless point to Alexandria, although perhaps to other authors or other periods of Alexandrian medicine. As to this, nothing definite can as yet be said. Whether Mansur Bin Muhammad Bin Ahman, the author of two of the Persian MSS written before 1400 (MS 23556 British Museum, London, and MS 1555 Bibliothèque Nationale, Paris), changed much on the drawings he had before him, Sudhoff doubts, but he asks through how many intelligent and more unintelligent hands had these drawings passed, after they had been designed on papyrus in Alexandria? Sudhoff is of opinion that the five-picture series were originally drawn in Alexandria.

With the beginning of the fourteenth century, the anatomic series of entire figures of the post-antique period experienced several transformations. The first by Henri de Mondeville, who had made entirely new full-length anatomic pictures for his lectures in Montpellier. This graphic independence of de Mondeville is amazing, however little one may value, from a pragmatic point of view, the professional achievements in the text of his *Anatomy*. These small figures, probably drawn from de Mondeville's original illustrations for anatomic instruction, are contained in a MS (2030) in the Bibliothèque Nationale at Paris and were allowed to pass with little comment up to Sudhoff's investigations of graphic anatomy. Judging from de Mondeville's descriptions of his drawings, they offered plenty of detail which the artist was unable to represent in the small space that was allowed him. It is unnecessary to go into details. Only one figure, the figure of seated Death, shows the squatting position with the knees spread apart; all the others are free from this constrained posture of centuries and present an easy pose, a fact which had been given a start in at least one of the figures of the



SKELETON, FROM A LATE THIRTEENTH-CENTURY PROVENÇAL MS (D. II. 11.) IN THE BASEL UNIVERSITY LIBRARY

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate I)



ANATOMICAL MINIATURES, FROM A FRENCH MS OF DE MONDEVILLE (2030) OF THE YEAR 1314, IN THE BIBLIOTHÈQUE NATIONALE, PARIS

(From Karl Sudhoff, *Ein Beitrag zur Geschichte der Anatomie im Mittelalter* ["Stud. z. Gesch. d. Med.," Heft 4], Leipzig, 1909, Plate XXIV)

Provençal codex of Basel. The representations of the skeleton pictures follow the medieval drawings of Death for symbolic and emblematic purposes, as they were also later used in the Dances of Death, etc.

The Mondeville pictures of the osseous system show the bodies covered with dried up soft parts (*lemures*), a condition which is not found in the skeleton pictures of the Prüfening and Scheyern, the Provençal, the Munich, the Oxford, the Raudnitz, and the Persian series. Of all the pictures of earlier times, only the skeleton of the Dresden MS, of the year 1323, has the real characteristics of the skeleton, but this was done a few years later and the drawings made after de Mondeville's dissections. In later centuries, this characteristic lemur feature is again shown in the skeleton pictures of the fourteenth, fifteenth, and beginning of the sixteenth centuries. No remarkable progress in the osseous pictures by de Mondeville is therefore noticeable, except in the elimination of constraint in posture.

Entirely free from tradition is his muscle manikin, carrying his skin on a stick over his shoulder, which does not show any copyist tendencies, but is already fully representative of the type of later artistic anatomy; i.e., exposure of the superficial muscles by removal of the skin, de Mondeville has priority in this picture, which undoubtedly influenced the artist Gaspar Becerra in his grotesque picture of the muscle manikin for Juan Valverde di Hamusco's *Anatomy*.

In the vein manikin, the origin of the blood vessels, the heart, and the liver are merely drawn on the body surface, as no opening of the thorax or abdomen has been made. This means of illustration was employed long after de Mondeville as, for example, in the vein manikin of Leonardo da Vinci.

An entirely original drawing is the body dissected from the back to show the viscera from this position. In the composition of the postures of his figures, de Mondeville seems not to have been without influence on posterity. That the many pictures of dissections, before and after de Mondeville, showed the cadaver on its back on a table, Sudhoff argues, is proof of the fact that it was not an unconditional requirement of the Middle Ages to draw anatomic scenes in a standing or squatting position. De Mondeville deliberately had his dissected figures drawn in a standing position, and in this respect, precedes all others entirely. Sudhoff also assumes that perhaps de Mondeville's pictures influenced Vesalius to a large degree.

De Mondeville's drawing must be regarded as an original accomplishment and his illustrative achievement as very remarkable.

A progressive enlargement of the traditional anatomic five-picture series is represented by sixteen of the pictures in a MS of Guido Vigevano (1345) and published by Ernest Wickersheimer, of Paris. They are three or four decades later than those which de Mondeville had drawn for purposes of instruction. The Guido drawings surpass de Mondeville's in many respects. They show improved technique in dissecting the abdomen: the abdominal viscera are still covered by the mesentery and afterward entirely free; thoracic cavity striking as to location and shape of heart; the shape of the liver and, on one of the plates representing a female cadaver, the seven-celled uterus is shown just as in the Provençal drawing of the female anatomy, differing only in its configuration. The last six pictures show in a very interesting manner the technique used in dissecting the cranial and spinal cavities. As a whole, it may be stated that they represent essentially a rather independent demonstration of the technique in dissection and of the most general configuration of the internal organs.

Wickersheimer, describes, for the first time, a MS from the library at Chantilly (Condé Museum MS 569, 1345 A.D.), containing the treatise on anatomy by Guido de Vigevano. In the introduction, Guido shows the usefulness of figures for the demonstration of anatomy and also the attitude of the church toward dissection of the human body. The Papal bull of Boniface VIII (1300), according to Neuburger (*Geschichte der Medizin*, 1911, II, 432) and to Wickersheimer, was not aimed at dissection but tended to prevent the practice of boiling and dismembering the bodies of crusaders who had died away from home, to facilitate transportation. The text of instructions which the Pope must have given the bishop is not known, but Wickersheimer is rather inclined to think that by submitting the study of the human body to a special class, the church placed under her protection the anatomists, toward whom popular sentiment had been hostile so long. Guido devoted himself with zeal to the practice of anatomy, either by special dispensation or illegally.

The eighteen figures, on the whole, are well designed and probably of Italian origin. The standing position of the figures is traditional, a feature which, according to Sudhoff, should be looked for in antiquity. It might be added here that at the time when the technique of drawing was rather rudimentary, the artist thought it easier to show the organs in a vertical posture of the body than by representing the anatomist bent over a horizontal cadaver.

Several of the pictures show a striking resemblance to those in the Provençal MS and to those in the Persian MS of the Bodleian Library.

In spite of these analogies, and in spite of the important part tradition has in these figures, the author proves that he was not merely content with reading but also understood how to observe. The proof for what he said in his introduction of having dissected human bodies is borne out, not so much in the figure of this or that organ, but in the manner in which he represents the technique of dissection in several of his pictures. In fact, these figures put before us for the first time an anatomy in three divisions, the abdomen, the thorax, and the head, an anatomy after the method of Mundinus, whose contemporary and compatriot Guido was and whose pupil he may have been.

Closer related to the post-antique period of the five-picture series than Guido's illustrative portion are five drawings in a fifteenth-century MS in the Royal Library at Stockholm. The first three pictures represent the osseous, arterial and venous, and nervous systems, while the other two represent the thoracic and abdominal viscera, and the contents of the skull and face from the front and back in a sagittal section through the median line. (Sudhoff's *Archiv*, 1914–15, VIII, 129–39, pls. 3–4.)

The position of the arms and legs of four of the pictures differs from the froglike posture of the late post-Alexandrian series. The arms are brought nearer the sides of the trunk and the legs are placed closer together. The arms of one of the visceral pictures are bent at the elbow in such a way that they seem to hold apart the two split halves of the thoracic cavity. This and the visceral figure are entirely original and without parallel in medieval anatomic art and, as Sudhoff believes, are not based on tradition whose power, he says, de Mondeville had destroyed. His theory is that the unknown person who inspired the artist had actually observed anatomic structures on the cadaver without comprehending much of it.

The picture of the blood vessels has many points in common with the Provençal drawing, especially as regards the position of the kidneys, while the skeletal figure is quite imperfectly drawn and has nothing in common with the Provençal picture. The illustration representing the nerves resembles most closely the pen sketches of the Arabic nerve figures.

Upon investigating two Persian MSS, one in the India Office at London (2296, about 1400 A.D.), and the other in the Bodleian Library at Oxford (1576), written a few decades later, there is suggested for Arabic medicine a traditional line of anatomic drawings from antiquity which perhaps spring from the same Alexandrian sources as the

occidental series just discussed.[1] How many of these anatomic group pictures might have originated from antiquity and were transmitted, Sudhoff is not as yet prepared to decide.

Both these series contain six pictures, viz., the osseous, nervous, muscular, venous, arterial, and gravida. The drawings of these two London and Oxford Persian series conform most intimately, one with the other. The skeleton is shown from the back, the head strongly bent backward with the chin occupying the highest point in the figure, establishing a relationship between the Provençal-Basel picture and the Munich drawing (13042), while the posture of all the series approaches the Prüfening-Scheyern series.

Of greatest interest is the illustration of the nervous system also shown from the back, with the head again bent backward. In this Persian drawing of the nervous system, we encounter, for the first time, another figure of an anatomic picture series, of which we have as yet seen only the osseous system of the occidental group.

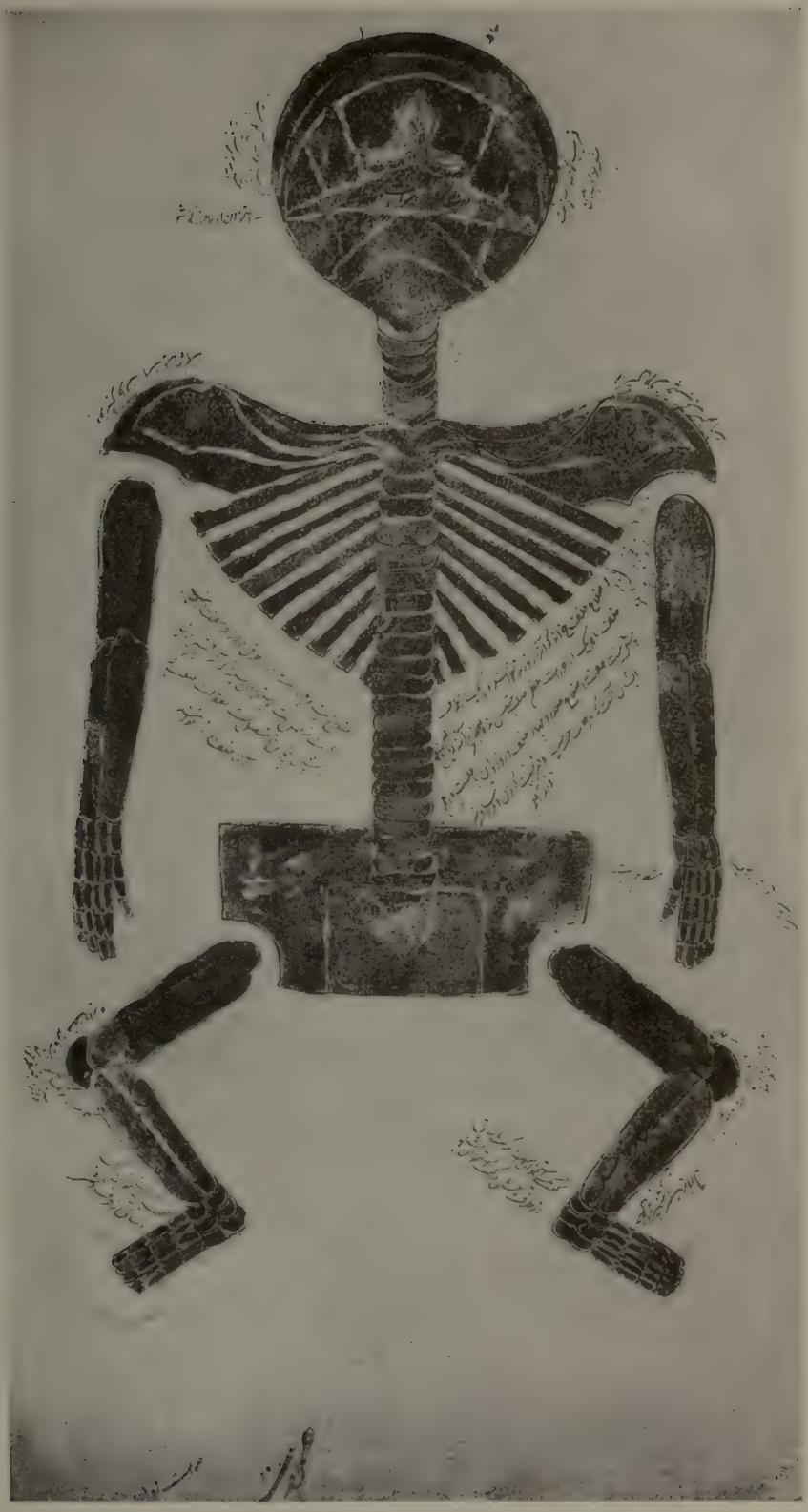
Of all the anatomic drawings of the Middle Ages so far studied by Sudhoff, the myologic picture has been most superficially treated, and in this respect the older drawings of the Prüfening-Scheyern system, while having no connection, are treated more elaborately.

The venous pictures of the two MSS differ considerably, but are of no consequence here. In the London picture, especial attention was drawn by Sudhoff to the shape of the heart, with the auricles and the position of the apex pointing slightly to the left.

The arterial system, representing the distribution of the arteries, shows few changes from the venous system. The heart is similar, below it lie the stomach, liver, kidneys, and spleen as small ovals, with hose-like loops of intestines tapering at the anus.

In the last and sixth drawing, that of the pregnant woman, the entire visceral representation conforms with that of the venous and arterial drawing. The fetus, seen from its right side, is squatting with the knee drawn up and the right hand resting on it. The egg-shaped uterus envelops it snugly and lies in the middle of the abdomen, with the fundus inclined slightly to the left. From the heart a blood vessel goes directly to the embryo. The vagina is omitted.

[1] Dr. Berthold Laufer, of the Field Museum at Chicago, discovered during his travels four Tibetan anatomic plates, which evidently belong together and are still in use by students in Tibet today. They recall, in their squatting posture, so many of the details of the Prüfening and Persian figures that one is forced to believe that the well-known post-Alexandrian anatomic figures were brought to India also and that the Indian and Chinese doctrines went through a peculiar process of amalgamation whose later results still confront us in the Tibetan plates. (For two of these figures, see Sudhoff's *Archiv*, 1914–15, VIII, 143–45.)



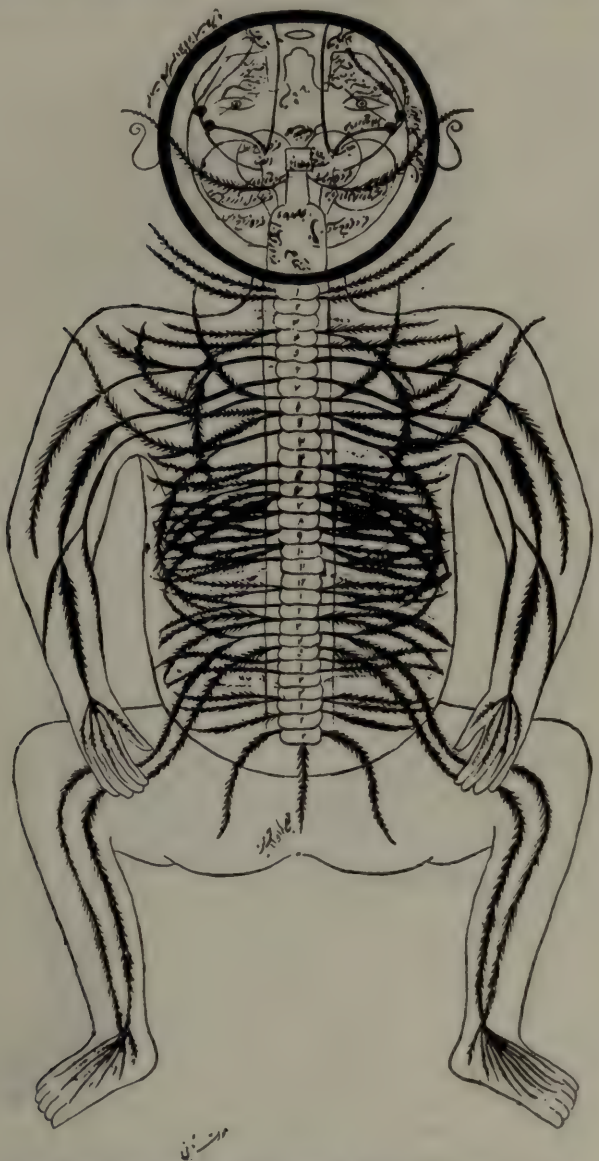
Skeletal System, from Persian MS, No. 2296, in the India Office, London

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate X)

ARTERIAL SYSTEM OF A PREGNANT WOMAN, FROM A PERSIAN MS, NO. 1576, IN THE BODLEIAN LIBRARY, OXFORD

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate XVIII)

As stated before, there has been no parallel in the occidental series for the drawing of the two Persian venous systems. But as to the type

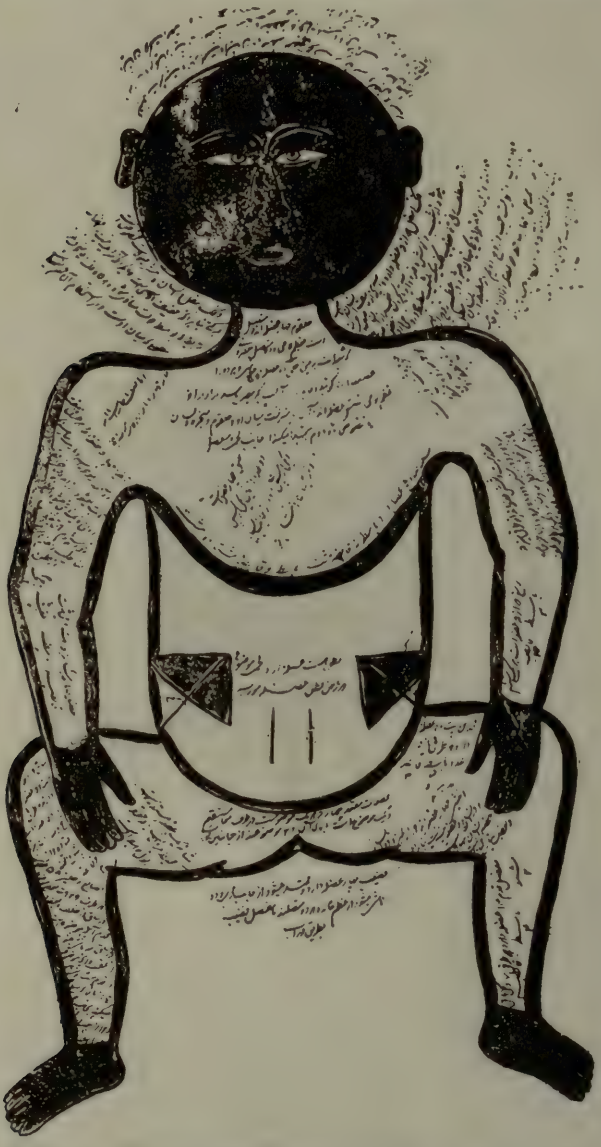


NERVOUS SYSTEM, FROM PERSIAN MS, NO. 2296, IN THE INDIA OFFICE, LONDON

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate XI)

of the *gravida* picture, the connection between the occidental and the two oriental figurations, while showing some similarity, is not at all

immediate. The squatting position is common to both occidental and oriental pictures, but not the position of the hand. The hands in the

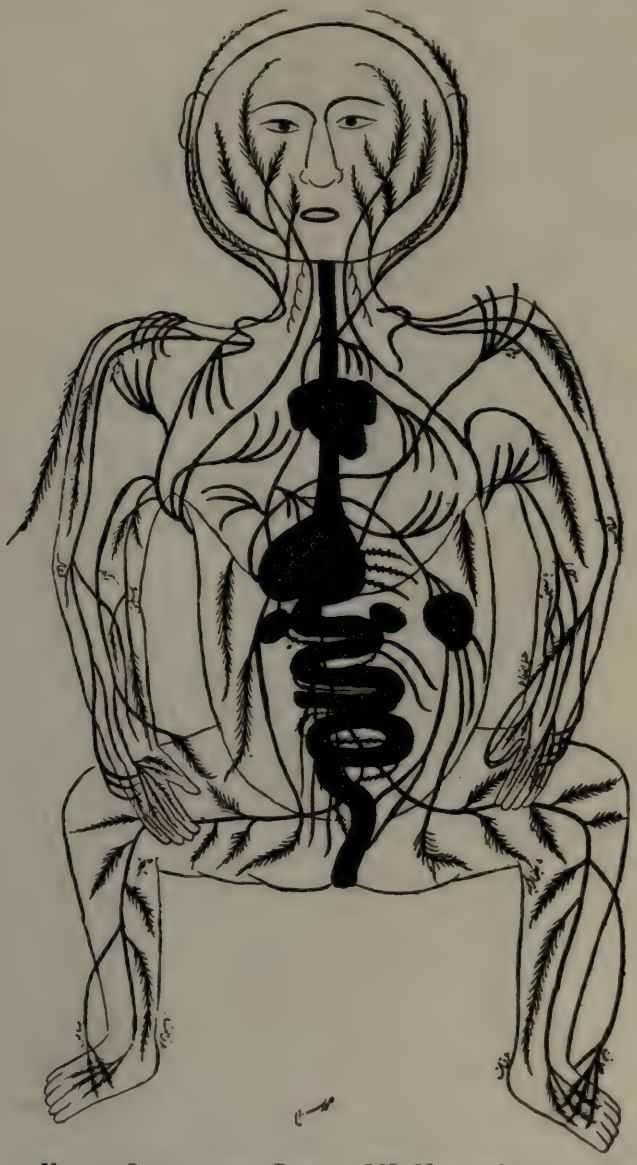


MUSCULAR SYSTEM, FROM PERSIAN MS, NO. 2296, IN THE INDIA OFFICE, LONDON

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate XII)

occidental series just discussed are raised to the height of the chin, a condition which is traditionally observed in the Ketham illustrations until 1543.

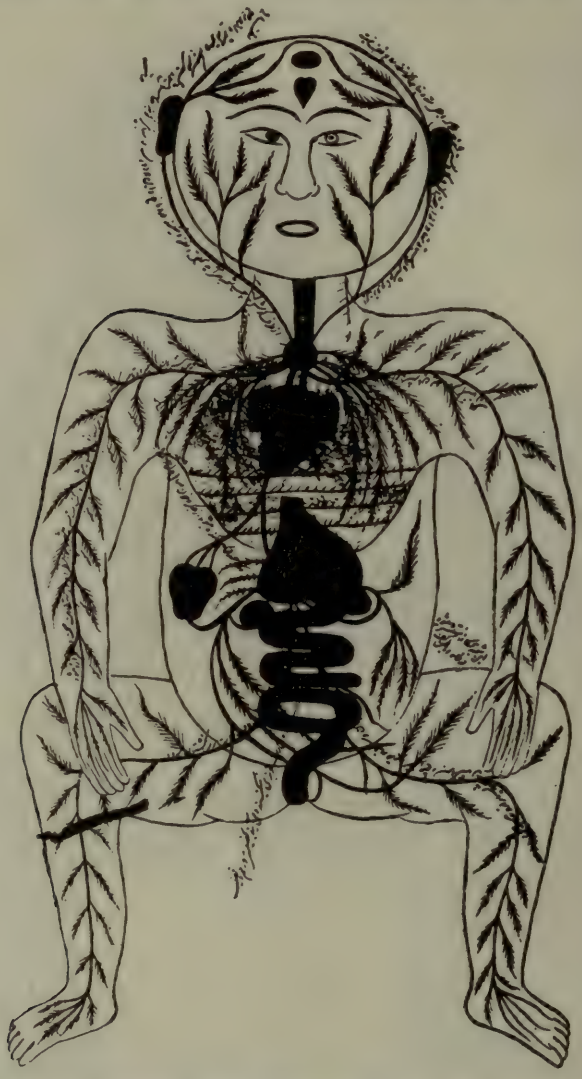
Other differences are the omission of the mammae, which are seen on all of the occidental pictures. In one very important point there



VENOUS SYSTEM, FROM PERSIAN MS, NO. 2296, IN THE INDIA OFFICE, LONDON
(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate XIII)

occurs, however, a rather striking conformity between these otherwise different representations of the *gravida*, which at the same time connects

the Persian arterial and venous pictures, with the oriental and occidental *gravida* pictures, viz., the bottle-shaped stomach, on all the illustrations



ARTERIAL SYSTEM, FROM PERSIAN MS, NO. 2296, IN THE INDIA OFFICE, LONDON

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate XIV)

of the abdominal viscera, is closely united on the right side with the liver, like the thick segment of an onion peel.

Through this shape of the stomach and liver, a close relationship is actually established between the representations of the pregnant woman,

so far studied, in the oriental and occidental MSS and the visceral pictures of the two Persian MSS. In contrast, the Prüfening-Scheyern,

ARTERIAL SYSTEM OF A PREGNANT WOMAN, FROM A PERSIAN MS, NO. 2296, IN THE INDIA OFFICE, LONDON

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate XV)

Oxford, and Basel drawings faithfully preserve the ancient many-lobed liver which was still used by Peyligk and Hundt, Reisch and Phryesen, Gersdorf and Reiff, and which even Vesalius, in 1538, had still retained

for purposes of instruction on plates 4 and 5 of his *Tabulae*, before his revolutionary reformation. Sudhoff makes the bold assumption that this type of lobed-liver may, in its traditional character, be associated with the oldest source of anatomic instruction, that of animal dissection, i.e., with the study of the sheep livers used for divine purposes in Babylonia and Etruria. While the drawing of the liver constitutes a sharp line between the occidental tradition, transmitted to us without oriental influence, and oriental graphic art, the drawing of the remaining organs, on the other hand, offers unsurpassable difficulties.

However great these differences are, yet there is much in the whole arrangement of this Persian series that must not be overlooked, viz., the froglike position, the employment of entire figures for illustrating visceral anatomy, the division and sequence of the drawings, and especially the picture of the skeleton.

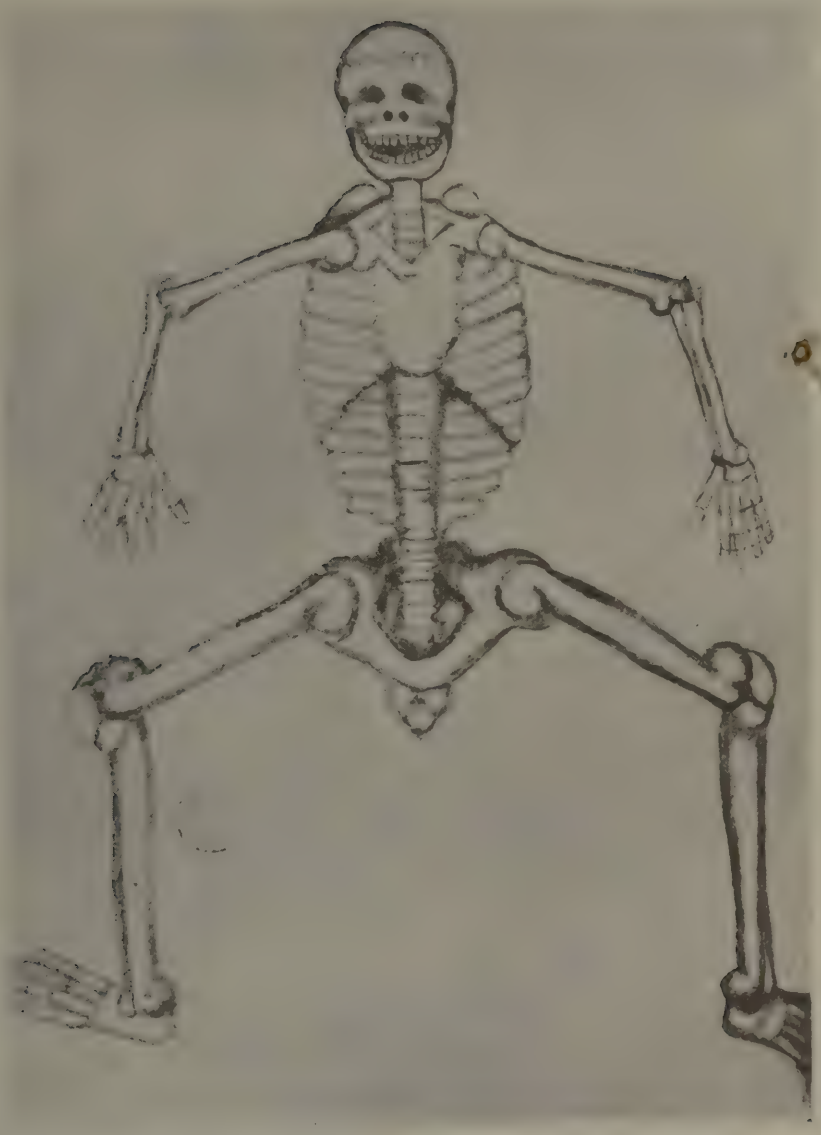
Notwithstanding the many legends attaching to the Persian drawings, further investigation of the question of textual connections is needed, Sudhoff believes. When this is accomplished, perhaps the question will be answered, where Arabic influence with reference to the anatomic picture and text series begins.

The anatomic drawings in the Prüfening-Scheyern MSS and in the Ashmolean MS (339) appear to have been transmitted directly from antiquity via Byzantium, although there might still be some doubt as to the Provençal pictures.

As for the anatomic drawings in the London and Persian MSS, there seems to be a suggestion of a line of tradition from antiquity by way of Arabic transmission, which may go back to the very same drawings from Alexandria, of which we have had examples transmitted from the Occident. However, there exists no certainty as to how many of these groups originated in antiquity and were then transmitted to the Occident and Orient.

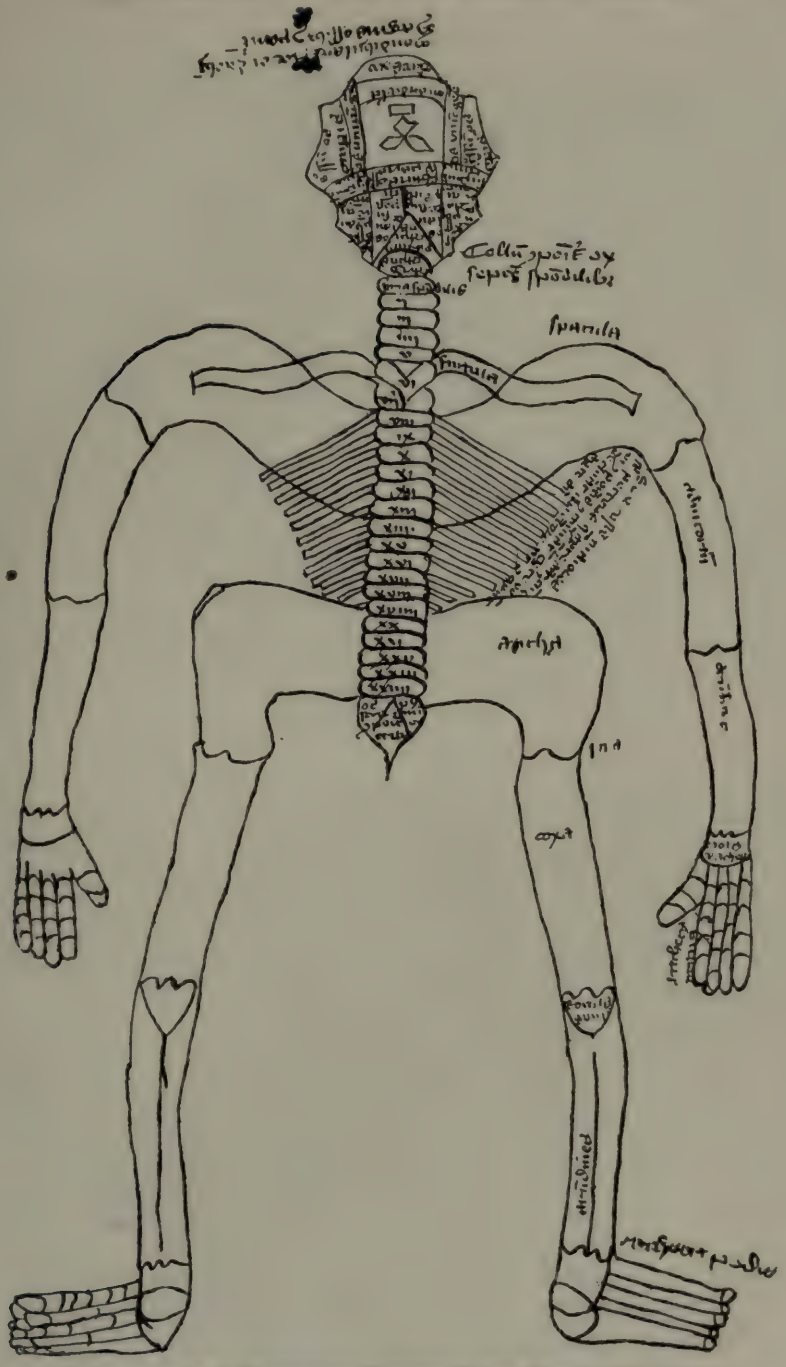
B: THE PROVENÇAL-BASEL SKELETON AND OTHER GRAPHIC SKELETAL REPRESENTATIONS OF THE MIDDLE AGES

On studying the crudely drawn skeleton of the Munich codex (13042) we observe a back view of the body and also of the skull, which appears to be bent so far back that the face, eyes, nose, and mouth are visible, and that the chin constitutes the highest point. There can be no doubt that the Basel picture was planned in the same way. Here the position of the legs, though still the original squatting one, is essentially the same as in the Prüfening-Scheyern and Provençal series. How completely



SKELETON IN AQUATINT, FROM DRESDEN MS CODEX 310 (1323 A.D.)

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1909, Plate VI)



SKELETON, FROM A FOURTEENTH-CENTURY LATIN MUNICH MS CODEX LAT. MONACENSIS 13042

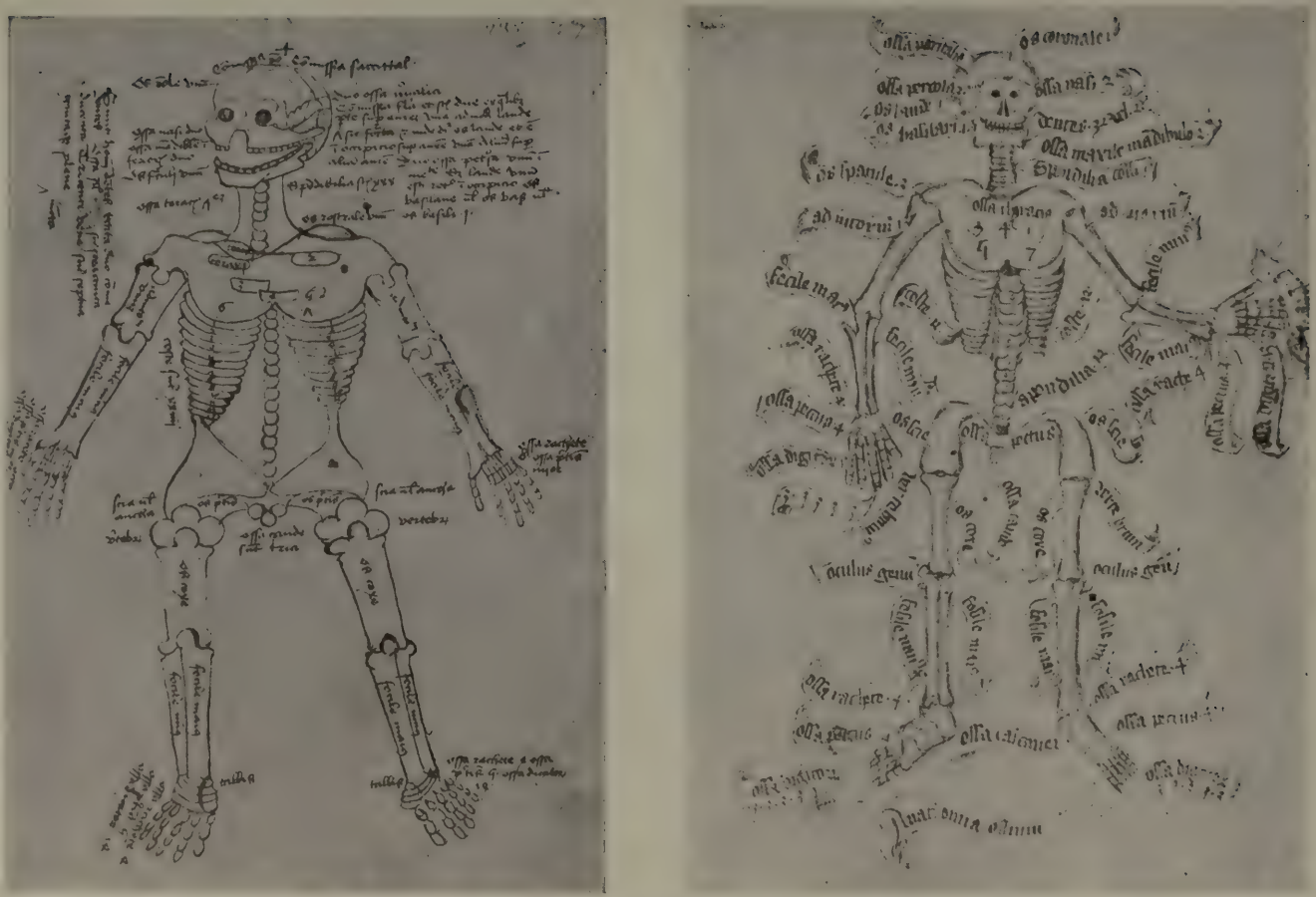
(From Sudhoff, *Tradition und Naturbeobachtung* ["Stud. z. Gesch. d. Med.," Heft I]. Leipzig, 1907, p. 63)

the two skeleton pictures, the Munich and Basel, agree, is furthermore proved by the explanatory inscriptions on each drawing. The number of the vertebrae corresponds in both pictures and considerable conformity is shown in the shoulder girdle and ribs. Sudhoff does not doubt that the Munich skeletal picture, which antedates the Basel by about 100 years, descends in an absolutely direct line, like the Provençal explanatory inscriptions, from the Latin model of the Provençal scribe of the end of the thirteenth century. The Dresden skeletal picture (MS Codex 310, 1323 A.D.) was probably not drawn after the model which had served for the Basel or Munich skeletal pictures. The differences are too considerable. First of all, the Dresden skeleton is a front view. The shoulder girdle is closed and the upper parts of the scapulae are visible. The sternum is strikingly broad, and the pelvis, drawn as a closed bony ring, cannot be made to harmonize absolutely with the Munich-Basel skeletal pictures. A thorough comparison, on the other hand, with the Prüfening-Scheyern osseous picture compels one to suppose that the Dresden skeletal picture is connected with the same series. Sudhoff also suggests that the Dresden skeleton is more realistic, either as being a more faithful copy of an earlier picture or because it was copied from a skeleton actually seen.

Another skeletal picture found in a MS in the Bibliothèque Mazarin (Codex 3599), written at the end of the thirteenth or the beginning of the fourteenth century, gives proof that the type of anatomic drawing represented by the Prüfening-Scheyern pictures and accepted, at the present state of traditional knowledge, as the earliest known, about the middle of the thirteenth century, was not the only one recognized during the Middle Ages. Here we have, on the threshold of the fourteenth century, the early type of skeleton with a dark abdominal portion, the gaping symphysis, and sutures of the skull.

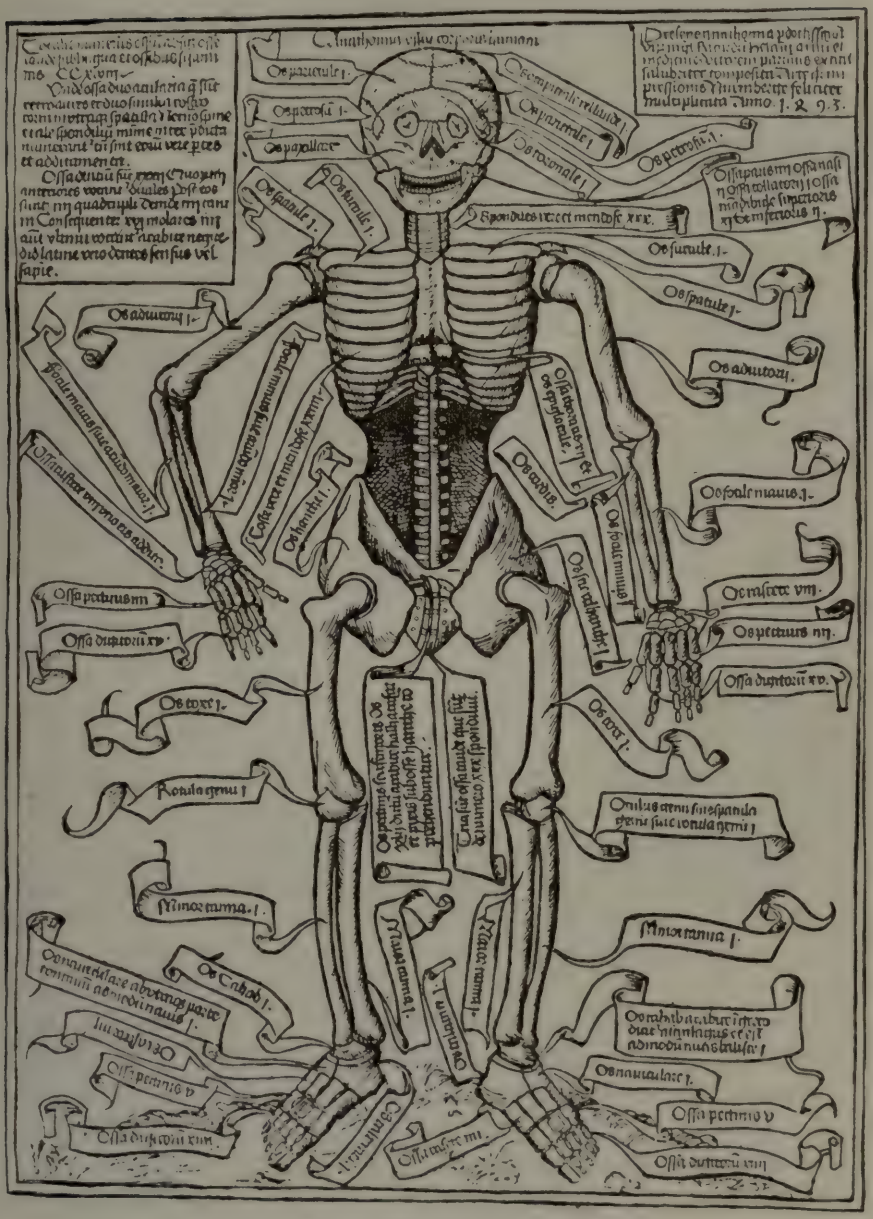
The picture of a skeleton from a codex (MS lat. 7138) in the Bibliothèque Nationale at Paris, belonging to the first half of the fifteenth century and representing a front view of a skeleton, reminds one of the skeletal pictures by R. Helain and Brunschwig-Grüninger in the region of the pelvis, although the dark abdominal portion of the Helain skeleton is absent in this drawing.

Among the features of the Helain figure (1493), are the dark abdominal portion, the expanded pelvis, the divided lower jaw, and numerous teeth, the bones of the feet and the "*os laude*" of the skull. The modified picture by the publisher Grüninger for Brunschwig's *Chirurgie*, 1497, still shows the pelvis gaping at the symphysis.



a Skeleton, from a Latin MS of the First Half of the Fifteenth Century (7138) in the Bibliothèque Nationale, Paris
b Skeleton, from a French MS of 1454, by Étienne Beludet (19994) in the Bibliothèque Nationale, Paris

(From Sudhoff, *Geschichte der Anatomie im Mittelalter*, Leipzig, 1908, Plate VIII)



SKELETON OF RICHARD HELAIN, NUREMBERG, 1493. THE ORIGINAL PLATE WAS 53 CM. HIGH

In a French MS (19994, 1459 A.D.) from the Bibliothèque Nationale at Paris we find the very model of the Nuremberg skeletal picture of 1493. Very striking is the conformity of the drawing of the tarsus on the right side with the Helain picture, as well as the drawing of the leg, the arm, and the forearm. The pelvis and femur have nothing in common. The assumption that the artist who drew the Helain and the Brunschwig-Grüninger skeleton was either given the opportunity to see a skeleton or parts of a skeleton, or that Helain or Hieronymus Brunschwig themselves caused corrections to be made on the skeletal figure after personal examination of a human skeleton, must not be absolutely rejected.

However obvious it may seem that the Nuremberg and Strassburg skeletons are related to the graphic traditions of medieval origin, there can be no doubt that during the last decade of the fifteenth century, direct anatomic observations considerably influenced tradition. The result has given us the two skeletal pictures which, from a graphic viewpoint, represent the best that were published of this kind before Vesalius. Whether the two skeletal pictures represent the direct result of observation of nature or whether they were traditional corrections of the one made in Paris, Sudhoff has not yet decided.

Among the woodcuts in the *Compost et Kalendrier des bergiers*, a shepherd's calendar, one widely known and held in high esteem by the early printers, we find pictures of the human skeleton. They bear a close connection to the Helain skeletal picture, although some parts seem to be related to the Brunschwig-Grüninger skeleton of 1497. From this Sudhoff concludes that Grüninger had his drawing done after a French model, not as yet found. With this last investigation, the history of the skeletal picture for anatomic purposes is brought to the year 1500.

For a discussion of these traditional topics and many other questions, a thorough specialization of the subject is needed. Sudhoff tried to develop a general viewpoint resulting from an exhaustive study of the graphic traditions, and to reveal new guide-lines of existing relations. The mass of anatomic material of the Middle Ages is far more extensive than at first appeared to Sudhoff, and he believes the whole MS anatomic material is in need of an exhaustive and thorough investigation and partial re-editing before many details can be decided.

C: MANUSCRIPT DIAGRAMS OF THE *FOETUS IN UTERO* AND THEIR ORIGIN FROM MANUSCRIPTS BY SORANUS OF EPHESUS

In this anatomic series there is no connection with an oriental medium. The traditional line goes back directly to antiquity without the mediation of the Arabs.

Soranus of Ephesus of the second century A.D. is our leading authority on the obstetrics of antiquity. His treatise on midwifery was the

Foetus in utero, FROM RÖSLIN'S "ROSEGARTEN," 1529 A.D. (AFTER WEINDLER)

original of such famous works as Röslin's *Rosegarten* (1513) and the plagiarized text of Walter Reiff (1545), and also William Raynalde's *Byrthe of Mankynde* (London, 1545). The *Rosegarten* of Eucharius Röslin with its quaint cuts was principally a compilation of the MS codices of Soranus-Moschion and was still a textbook on obstetrics after a lapse of nearly fourteen centuries.

The title *Rosegarten* was derived from the fabled "Rose Gardens" at Worms and in Switzerland and from Röslin's interpretation of his own name as "rose," rather than *Ross*, a "horse."

The earliest occurrence of the uterus and the traditional pictures of the *foetus in utero* are found in a ninth-century Moschion codex (3701–3714) in the Royal Library at Brussels. The oldest known

drawing of the uterus contained in this MS is flask-shaped and has at its fundus two ear-shaped processes suggestive of the adnexa. The drawings of the positions of the fetus number only twelve, while in the later MSS, such as found in Copenhagen, Paris, Dresden, Rome, and Munich, they number from fifteen to sixteen positions.

The Copenhagen codex (1653), dating from the twelfth century, contains fifteen pictures, one of which is a twin pregnancy. The fetuses, in sprightly positions, are inclosed by the chorion in the flask-shaped uterus and the whole surrounded by a double circle representing the peritoneum. In the Palatine codex at Rome, about one hundred years later, which is closely related to the above, the drawings number sixteen, a second twin pregnancy picture having been added. The circles of the peritoneum still inclose the whole figure.

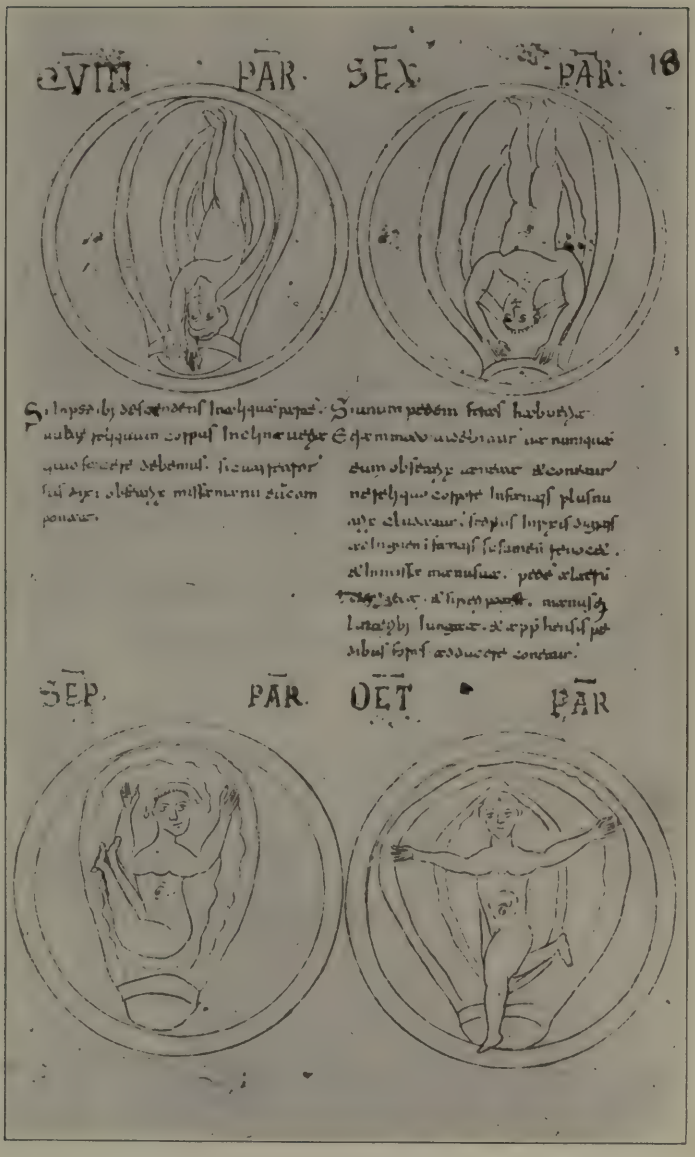
A very different impression, from an artistic point of view, is given in the illustrations of the Latin Munich codex (161) written about the thirteenth century. The drawings are highly artistic and decorative and omit the chorion and peritoneum.

Older than the Munich MS, but in the same line of tradition, is a page from a twelfth-century parchment codex (190) in the Thatt's collection at Copenhagen containing fetus drawings. This old page, completely isolated from the rest of the MS, is covered on both sides with eight drawings of the pregnant flask-shaped uterus. The drawings are placed in a decorated frame with arches and pillars richly colored and in gold, showing Byzantine influence, and with blank spaces for legends.

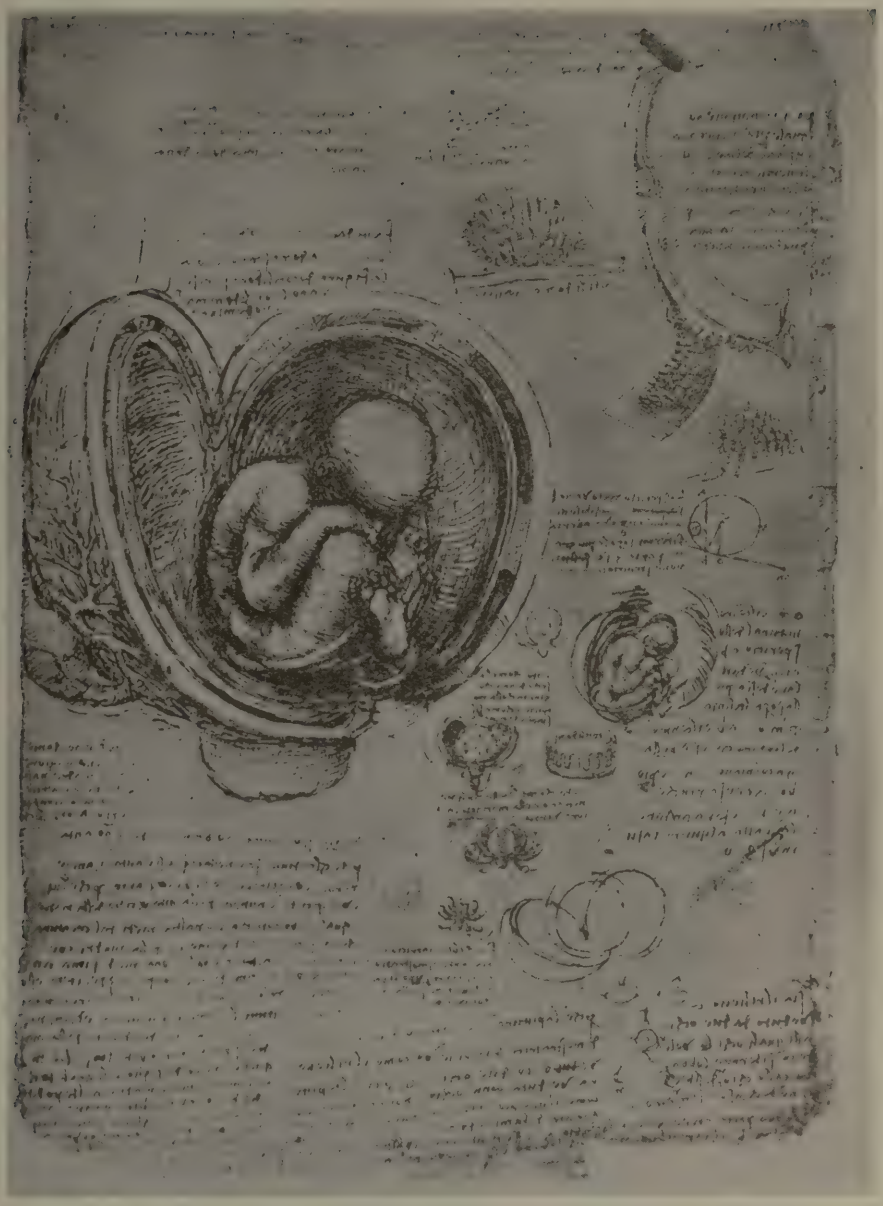
In all probability Röslin got his inspiration for his illustrations of the *foetus in utero* from the Heidelberg codex of the Vatican Library at Rome. Martin Flach, Jr., had them cut in wood in Strassburg by the noted form-cutter (*Formschneider*) Erhard Schön in 1513. The little volume, in spite of its present-day absurdities, opened up at that time a new era in obstetrics. Later editions, chiefly from the same wood blocks, were published by Henricus Gran at Hagenau. The Swiss obstetrician Jacob Rueff of Zurich, in 1554, corrected these wildly fantastic pictures somewhat in his *Trostbüchle*, but most of his figures differ but little from the traditional Röslin drawings.

One hundred years later, the Röslin illustrations still haunt the editions of Jacques Guillemeau, a noted pupil of Paré, which were revised by his son Charles Guillemeau.

A dozen years before the enterprising Röslin used the drawings from the Heidelberg Soranus-Moschion codex, the great universal genius



Foetus in utero, from a Twelfth-Century MS Codex No. 1653, in the Royal Library, Copenhagen (after Weindler)



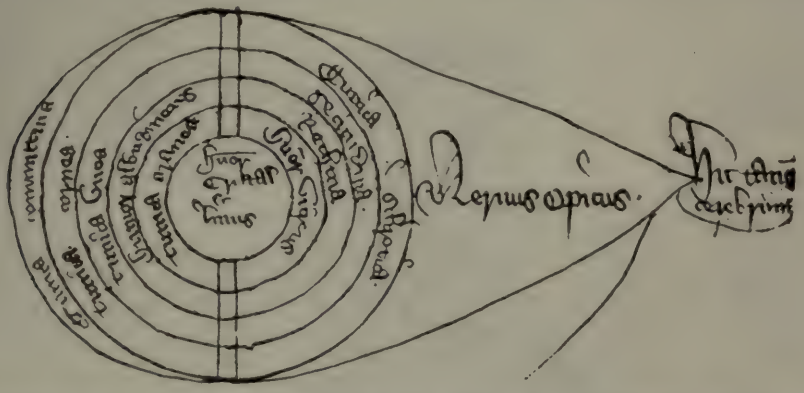
Foetus in utero AFTER LEONARDO DA VINCI, 1510 A.D.

Leonardo da Vinci illustrated the fetus in its natural position from direct personal observation.

Not until Smellie (1754) and William Hunter (1774) published their monumental volumes do we actually find illustrations of the *foetus in utero* which were really observed and faultlessly reproduced from an anatomic point of view.

D: THE SCHEMATIC DRAWING OF THE EYE IN ITS HISTORIC DEVELOPMENT (FIFTEENTH AND SIXTEENTH CENTURIES)[1]

The difficulty encountered on examining an eye anatomically in earlier times probably led every auditor to form his own conception of that which was orally presented to him. These concepts must naturally



SCHEMATIC EYE ON THE BACK OF ONE OF THE PAGES OF A FOURTEENTH-CENTURY MS IN THE BRITISH MUSEUM (SLOANE MS 420)

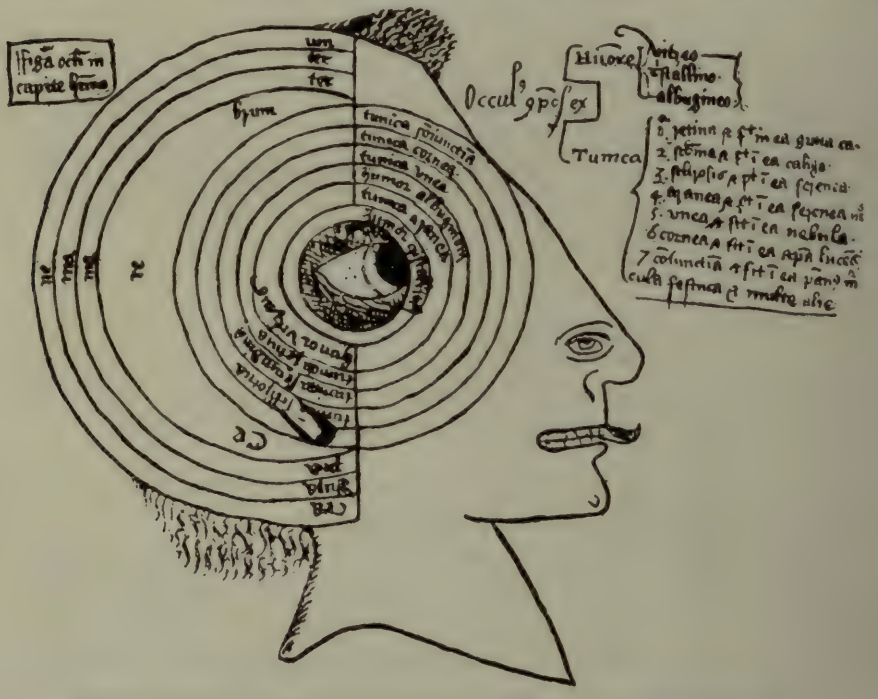
have been very unequal and thus drawings were made for teaching purposes, some of which have been preserved.

Sudhoff's investigations commence with an anonymous *Anatomia oculi* on the back page of a thirteenth-century MS in the Sloane collection of the British Museum (420). The eyeball and its tunics is shown to be made up of circles and divided perpendicularly by two straight lines into an anterior (left) and a posterior (right) half. Below the figure at the left, appears *Pars oculi exterior;* at the right, *pars oculi interior.* The innermost circle, which is not divided, is inscribed *humor cristallinus* and the inscriptions from within outward in the hemispheres surrounding this, are for the anterior half (*pars exterior*) as follows: *tunica aranea,*

[1] Sudhoff: *Tradition und Naturbeobachtung*, Leipzig, 1907, pp. 21–26.

humor albugineus, *tunica vuea* (*uvea*), *tunica cornea*, and *tunica conjunctiva*. The *tunica conjunctiva* has been drawn like a periscopic lens which gradually thins out toward the poles of the eyeball, an idea which probably originated from a misunderstood drawing of the cornea. The posterior half is inscribed, reading from within outward, as follows: *humor vitreus*, *Rethina*, *Secundina*, *Tunica sclerotica*. From the upper and lower folds of the eyeball two straight lines lead to the right (*pars posterior*) and intersect at an acute angle (the limits of the orbit?), and at their point of intersection is written *Hic tanget cerebrum;* that is, the place of entering the brain. From the equator of the posterior half to the point of intersection of the two straight lines is the inscription *Nervus opticus* without any linear limitation.

In another Sloane MS (981) belonging to the second half of the fourteenth century, there is a short text with an illustration pertaining to



Schematic Eye in a Fourteenth-Century MS in the British Museum
(Sloane MS No. 981)

ophthalmic anatomy. The figure represents a cross-section of the entire head in the center of which is an eye surrounded by circles and semicircles like the coats of an onion. Here, as in the diagram above, the

circles are divided by a perpendicular line into an anterior and posterior part, with the same inscriptions as in the foregoing. Behind the posterior part is a moon-shaped sector marked *Cerebrum*, surrounded by three semicircular segments inscribed with the names of the coverings of the brain.

The Vatican Library at Rome possesses the Codex Urbinus (246), a MS written in the second half of the fourteenth century or the beginning of the fifteenth, including among its contents the anatomy of Mundinus. Where the structure of the eye is discussed, a later owner drew, on the margin of the page, a diagram of the arrangement of the coats of the eye in the manner already described and with the same inscriptions within the circles.

Chronologically following the preceding pictures is one in the Leipzig codex (1183) ascribed to the first half of the fifteenth century. Sudhoff

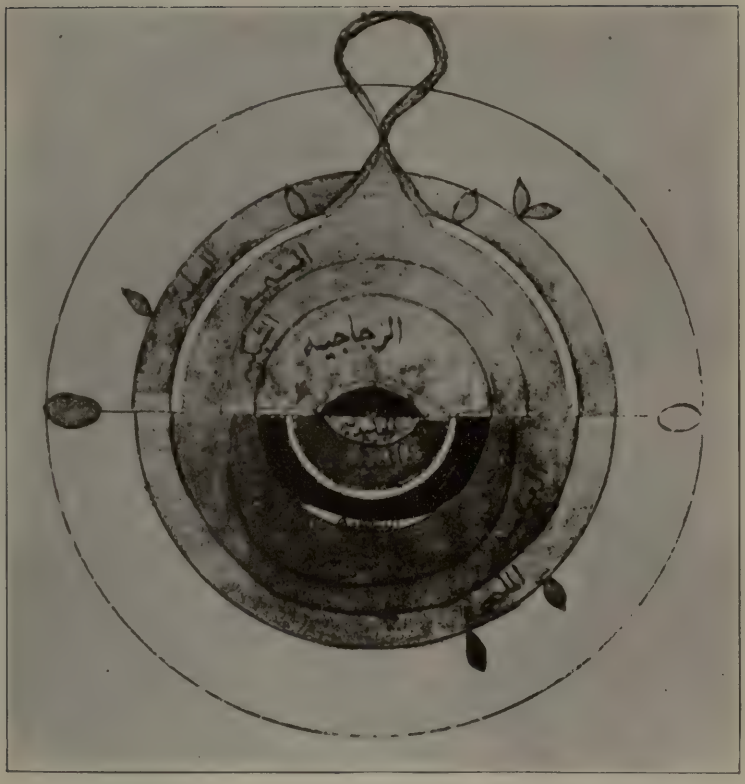
SCHEMATIC EYE, FROM A MS OF THE FIRST HALF OF THE FIFTEENTH CENTURY (CODEX LEIPZIG NO. 1183)

does not agree with Hirschberg of Berlin that this diagram should be ascribed to the Spanish-Arabian ophthalmologist Alcoati. This hasty pen-and-ink sketch of the fifteenth century upon the margin of a page

was copied from some unknown source. The evidence is proof of the fact that, independent of Arabic tradition, a cross-section of the eyeball must have been handed down during the Middle Ages through the Occident. He also points out that the placing of the cornea outside the conjunctiva is directly contrary to Alcoati. Alcoati did nothing original in ophthalmology and surely not in his anatomy. The latter originated with the Greeks and from them passed to the Arabs and thence to the Occident and to Salerno and other medical schools through many different channels, and finally also through the Latin translations from the Arabs. The Arabs made no anatomic investigations of their own on the eye, just as they made none on any other parts of the body. The many religious hindrances made the publication of drawings representing parts of the human body absolutely impossible or highly difficult. But even as other diagrams and sketches of organs were made in Alexandria, so there can be no doubt whatever that diagrammatic drawings of the structure of the eye were there and found their way during the Middle Ages to the Orient and Occident. On the other hand, we have no proof that all the pictures of the eye which are found in the Latin editions of Arabic authors come from Arabic tradition. Sudhoff does not doubt that the Arabs possessed Greek diagrams of the eye in graphic form, but no MS of any Arabic work during the Islamic zenith contains a drawing of the eye.

During the second half of the thirteenth century, the decline of Islam, the Syrian Halifa wrote a treatise on ophthalmology of which two MSS are known. The drawing in the Constantinople MS (924) of the sixteenth century illustrates the structure of the eye and its connection by means of the chiasm with the brain. This picture, before Sudhoff used it, had been published several times without text by Hirschberg.

Another interesting drawing of the eye which also shows a horizontal cross-section divided into an anterior and posterior portion by a median line, as in the occidental models, is found in an Arabic MS (3008) in the Bibliothèque Nationale at Paris written in 1714. This is a very late transmission if we consider that the portion on the eye by the Syrian, Salah-Ad-din, is said to have been written about the year 1296. The drawing was first published by Pansier and later again by Hirschberg, but without the anatomic text which Sudhoff gives. It illustrates the combination of two cross-sections of the globe perpendicular to one another, and plays even today a certain rôle in the Arabic world according to Hirschberg. Sudhoff does not agree with Hirschberg's interpretation of the picture, which is of no consequence in this discussion. Whether



Schematic Eye, from an Arabic MS (No. 3008), in the Bibliothèque Nationale at Paris (1714 A.D.)

it was the original illustration for Salah-Ad-din's textbook, and as such inserted about the year 1296, or whether it was drawn without any influence from the Alexandrian or even Byzantine sources, Sudhoff is not prepared to say.

Further researches might establish for these graphic representations of the structure of the eye an earlier date than the year 1300, beyond

SCHEMATIC EYE, FROM A MS (No. 924) IN CONSTANTINOPLE (1560 A.D.)

which none of the present illustrations go. Earlier drawings by Hobeisch of the ninth century and by Hammar of the eleventh century have not been preserved, as far as recent researches have gone. The assumption might also be made that all these drawings found their models in a late Alexandrian period which remained alive in the traditions of the Orient and Occident far into the fifteenth century, if not longer, and

which appear to have been not without influence even upon Leonardo and Vesalius. (See also, Sudhoff's *Archiv*, 1914–15, VIII, 1–21.)

The oldest printed illustration of the structure of the eye is found in the *Margarita Philosophica* by Gregor Reisch, published by Kaspar Schott at Strassburg, on April 17, 1504. The external view of the eye on the same page is a revised reproduction by Johannes Peyligk and Magnus Hundt. The Freiburg Carthusian monk, Sudhoff says, undoubtedly got his drawing from tradition, as is the case with most of the other illustrations in his book.

With this early accessible model created in the various editions of the *Margarita Philosophica*, it found a place in other works, as for instance, Hieronymus Brunschwig's *Distilierbuch*. Very soon afterward, it is found in many ophthalmic treatises with alterations and additions. Independent modifications, however, are first observed in a rather similar illustration which Walther Reiff uses in his *Anatomi*. However incomplete the illustration still is, there already appears a trace of some independent anatomic observation, some real study of nature. Reiff's picture of the eye had a long life and was reproduced by Anton Novarinus as late as 1681.

Individual conception does not come to the surface until the publication of the *Fabrica humani corporis* by Andreas Vesalius in 1543. His drawing is not wholly true to nature, especially as regards the crystalline lens. Vesalius could not free himself from the tradition that the crystalline lens had its seat in the center of the eye, a fact that he particularly illustrates in several detailed drawings.

In some respects, it must be admitted that Leonardo da Vinci had already, through his own individual observations, come nearer the truth than all his predecessors and all his successors up to the time of Vesalius. He not only treats of the anatomy of the eye, but also considers it from the viewpoint of optics.

E: SCHEMATA OF THE MALE VISCERA IN BLOODLETTING MANIKINS OF THE FIFTEENTH CENTURY[1]

The creation of the type of bloodletting manikin (*Aderlassmann*) arose from a decidedly anatomic and surgical need, and the picture therefore preserves its original purpose, or goes back to its fundamental

[1] Sudhoff: *op. cit.*, 29–48. Many other bloodletting manikins have been given in Sudhoff's *Beiträge zur Geschichte der Chirurgie in Mittelalter*, Leipzig, 1914, 67–197, Plates XLII–LVIII, but the translator has refrained from using these, as being new copyrighted material, adding little to the main tendency of Professor Sudhoff's earlier investigation.

SCHEMATIC EYE, FROM A PERSIAN MS (1690 A.D.)

principle, when it passes later in its transition into zodiac-manikins, with a schema of the male viscera. The early drawings of bloodletting manikins frequently showed the abdomen and thoracic cavities opened in order to render more strikingly and without words the best sites for venesection under the signs of the zodiac, and their relation to the most important internal organs. These were indicated by lines running from the zodiacal signs at the side of the drawing. In this manner the bloodletting picture served not only its purpose of instruction in venesection but also, with only a slight deviation from its purpose, questions relating to the location of the male viscera. The bloodletting manikin also monopolized and satisfied for a long time, and up to the end of the fifteenth century, the anatomic needs of physicians and surgeons. In a similar manner originated later the wound manikin (*Wundenmann*), whose body is mauled and pierced by stones, arrows, swords, and spears, the points of incision, or lesion, showing the sites for ligation of the different arteries, or for bloodletting.

Much earlier the bloodletting figure illustrated graphically with the schemata of the viscera, the planetary influence of the twelve sections of the zodiac upon the human body (*Tierkreiszeichenmann*), and the most favorable localities for applying treatment. At first, the names of the zodiacal diagrams were written at or on the corresponding parts of the body as convenient aids for the memory. Later, however, the zodiacal signs were actually printed or drawn upon the manikin, or around the figure, with a separate line leading to the part of the body governed by the sign. Sudhoff regards the Etruscan *donaria* as the prototype of the zodiac-manikin, of which he gives a thirteenth-century specimen in colors in his Syphilis Album (1912, pl. 3); another is found in a fifteenth-century Greek MS in Paris.

A figure which very exactly designates places for bloodletting, giving the complete customary names of the vessels to be opened, originated in 1432. It consists of a colored pen-drawing found in a Latin Munich MS (5595). A rather careless drawing of an early picture was engraved in 1491 and published in a popular little book with rhymed rules for hygienic living, viz., Heinrich Louffenberg's *Versehung des Leibs*.

The bloodletting figure of de Ketham constitutes a serious, scientific, and artistic piece of work that does not, in every single word, follow rigidly traditional lines but rather adopts the best from earlier authors. The figure was further developed and used for the first time in the ninth Venice edition (1507) of the *Articella*, and in all the later ones. The first edition appeared in 1480 and the work ran through fifteen editions.

In a pen-drawing by Wolfenbüttel, representing the figure with the signs of the zodiac, the names of the signs are written across the body and the various regions separated by horizontal lines. More frequently the astrologic dependence is strikingly illustrated by the pictures of the signs drawn directly upon the corresponding parts of the body. In the Augsburg woodcut of the *Versehung des Leibs*, 1491, the twins ride the arms of the zodiac figure.

In the rather crudely drawn male figure with the signs of the zodiac in de Ketham, the signs are drawn on the body, and little plates contain the most concise information as to what month each sign of the zodiac corresponds, and what part of the body is governed by it.

In the fifteenth century it was customary to remove the pictures of the signs to a distance from the body of the illustrated manikin. This was done so that the artist could illustrate at the same time the more important internal organs and involuntarily, or intentionally, he came to make anatomic illustrations of the *viscera in situ*. Thus the bloodletting manikin became the early model for the anatomic picture.

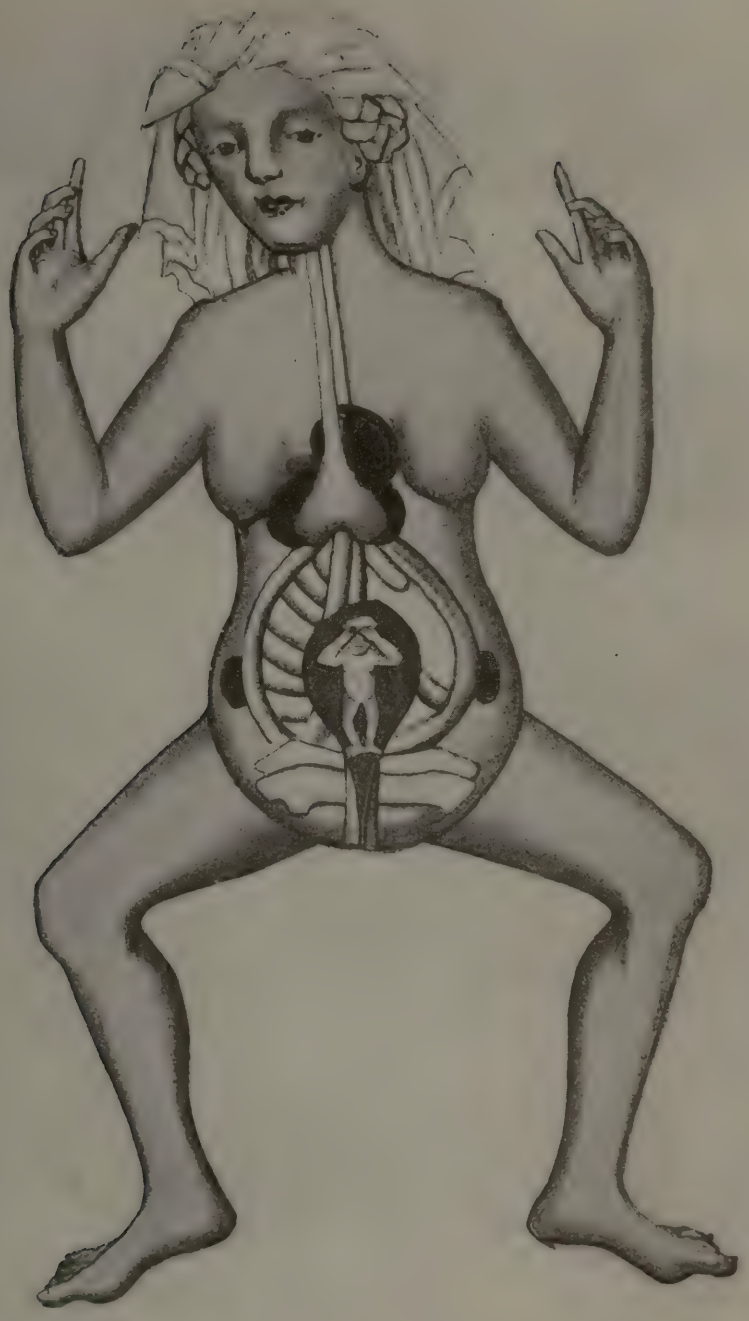
Rarely were these signs dropped altogether and we meet with illustrations showing visceral locations in a figure standing in the traditional position. Such a woodcut of some anatomic interest was printed at Haarlem in 1485 in a Low German translation of *De proprietatibus rerum* of Bartholomaeus Anglicus. Standing in front of a walled garden is the figure of a man with the abdominal cavity opened and a very diagrammatic representation of the viscera. Within the garden, the figure of Eve appears before the Lord, emerging from the side of the sleeping Adam. Although the abdomen is not opened widely, it shows all the viscera which could have interested the phlebotomist.

One of the early illustrations with the signs of the zodiac and dissected abdominal organs is found in the Basel edition of 1504 of Reisch's *Margarita Philosophica*.

The dissected phlebotomy manikin with the zodiacal signs in Martinus Flach's edition of Mundinus' *Anathomia*, published at Strassburg in 1513, comes without question within the scope of the visceral schema whose model was the early bloodletting manikin.

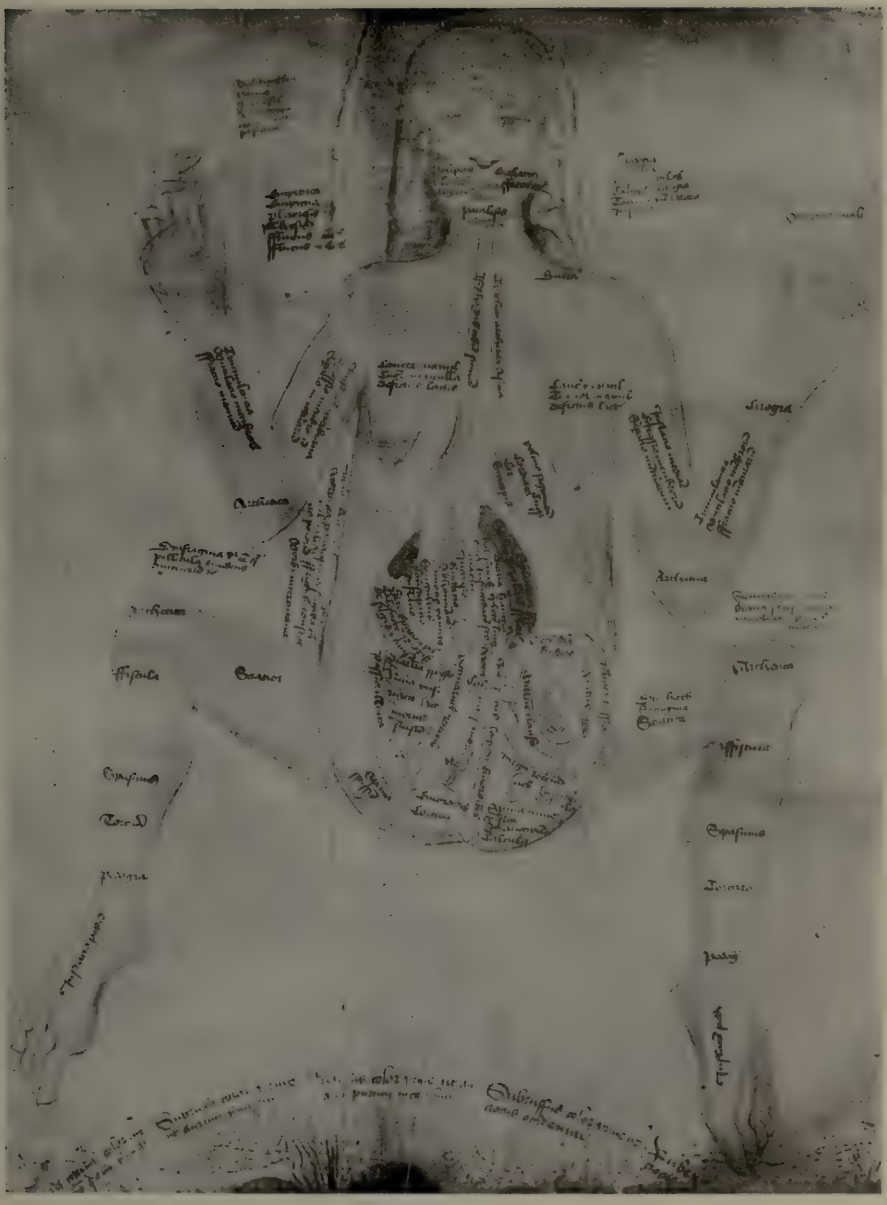
The simultaneous occurrence on the same plate of the signs of the zodiac and the *situs viscerum*, brings out unmistakably the close connection between the zodiac and the bloodletting regions. Thus the zodiac manikin was the indispensable complement of the bloodletting manikin.

A sketch of a kind of bloodletting figure by Leonardo da Vinci shows to what clarity his artistic mind had advanced as regards his conception



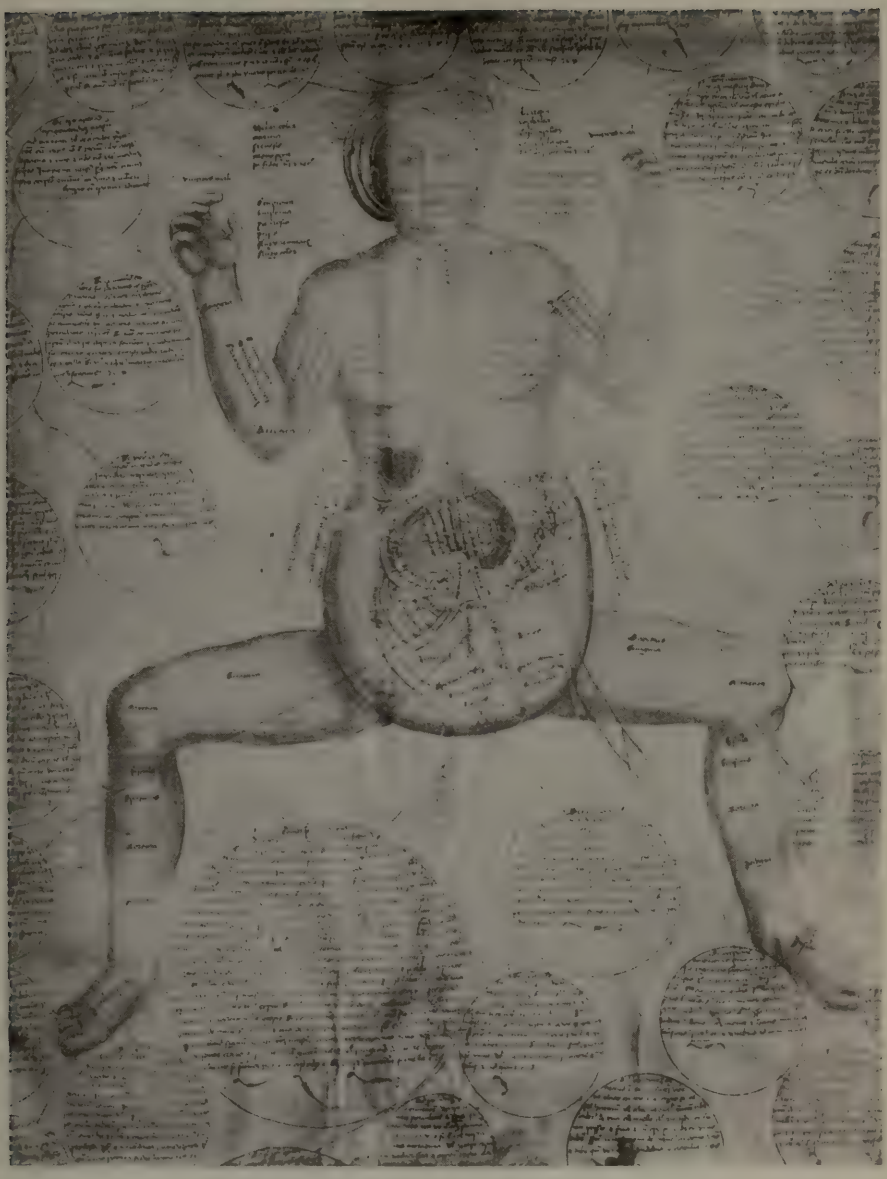
Gravida, FROM A MINIATURE PAINTED ABOUT 1400 A.D. IN A LEIPZIG MS CODEX 1122

(From Sudhoff, *Tradition und Naturbeobachtung*, Leipzig, 1907, Plate XX)



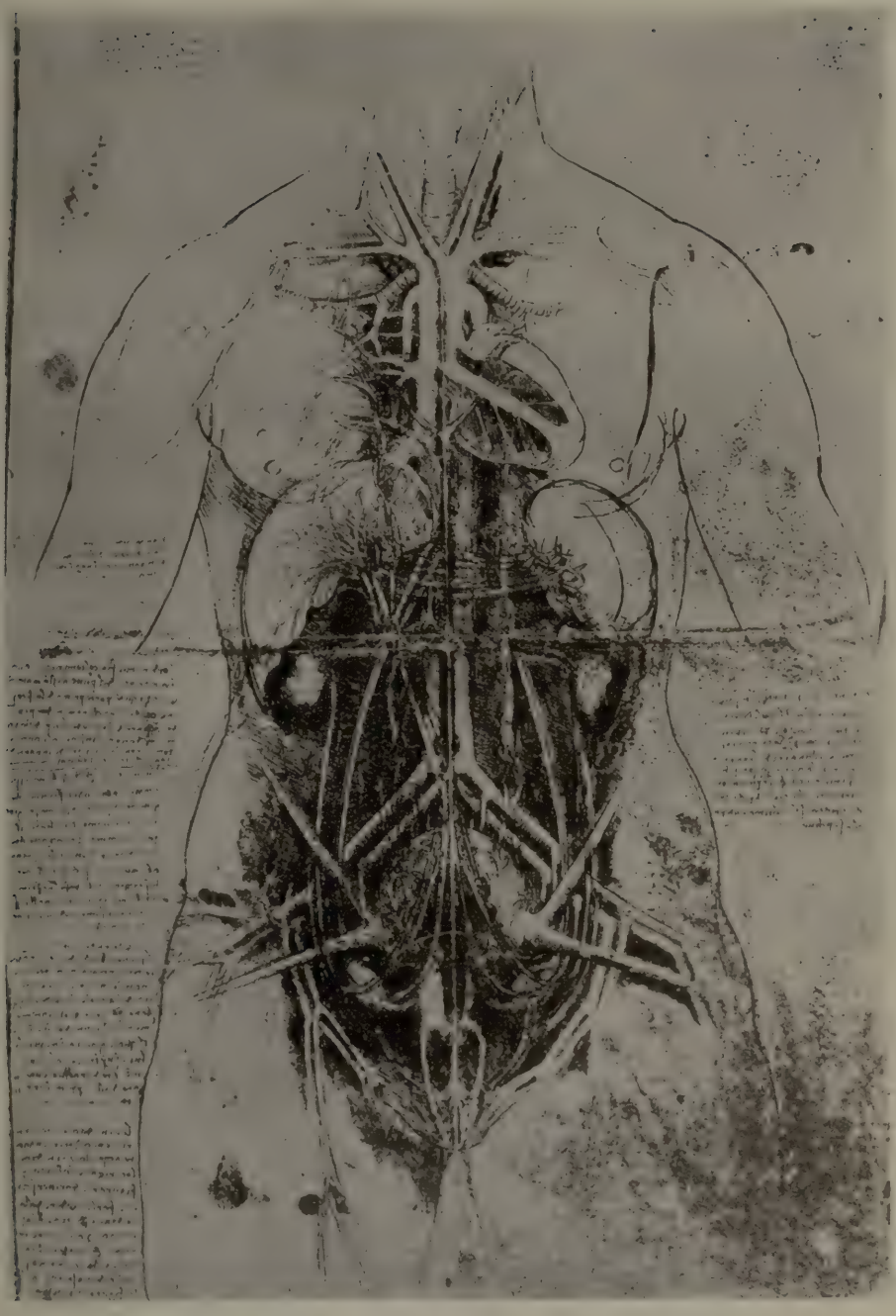
Gravida, FROM COPENHAGEN MS, BEFORE 1450, COD. NY. KGL. SAML. 84*b*, VERSO PAGE 4

(By courtesy of Professor Karl Sudhoff)



Gravida, FROM COPENHAGEN MS, NY. KGL. SAML. 84*b*, PAGE 2 (*circa* 1515–20)

(By courtesy of Professor Karl Sudhoff)



FEMALE *viscera in situ* BY LEONARDO DA VINCI, 1510 A.D.

of the localization of the circulatory organs in the thoracic and abdominal cavities. The sketch is in the traditional posture and drawn upon the surface of the skin is the topographical anatomy of the circulatory apparatus with the liver, spleen, kidneys, and bladder, the "blood-vessel tree," as he himself had written alongside of the picture.

F: SCHEMATA OF THE FEMALE VISCERA *IN SITU* ABOUT 1400–1543[1]

In this series, Sudhoff bases his discussion on a drawing in the Leipzig Codex 1122 (*circa* 1400), from a *gravida* in Codex germ. Monacensis 597 (1485),[2] and from two pictures in a Copenhagen series, here published.

It represents a nude female figure, without a suggestion of the external genitals, in a slightly squatting position, with the legs spread apart to show the vagina. The arms are raised and slightly bent at the elbows. The uterus is the crude bottle-shaped type of the twelfth and thirteenth and earlier centuries. The top of the head is covered with a headdress gathered in front with a ribbon, and with long tresses hanging down on both sides of the face. Drawn upon the thorax and abdomen of this undissected figure are the trachea and oesophagus, the heart inclosed by the lungs, the bottle-shaped stomach drawn in at the bottom, a lobeless liver with gall bladder, intestinal convolutions, at the left and right far to the side the kidneys, and directly in the middle line of the abdomen the pregnant bottle-shaped uterus, opening directly into the vagina. All these configurations are schematic in character, excepting the five or six months' old fetus which is in a standing posture, in a foot presentation, with the legs slightly bent and the hands covering the eyes. Although worthless anatomically, it is of immeasurable value as a missing link for the oldest typographic representation of the *gravida*, viz., the female *situs viscerum* picture in the edition of 1491 of the *Fasciculus medicinae* by de Ketham. The conformity between this Leipzig drawing and de Ketham's woodcut is nearly perfect as regards the position, headgear, and drawing of the viscera. Although there are slight differences in the other details enumerated in the MS drawing, nevertheless Sudhoff reasons that the artist for de Ketham's work, or his publishers—the brothers Gregorii, must have used a model similar to this one, as more of the pictures must have existed.

Another link in the series was found in a fugitive MS sheet, owned by Professor Gustav Klein, of Munich, probably about half a century later

[1] Sudhoff: *op. cit.*, 79–90.

[2] Sudhoff's *Archiv*, Leipzig, 1907–8, I, pl. 4.

than the Leipzig picture. This group of two MS drawings and de Ketham's woodcut is very instructive in every respect. The headdresses of the two MS pictures resemble each other more closely than that on the de Ketham woodcut, while, on the other hand, the viscera on the de Ketham picture and the Leipzig MS approach each other. On the whole, without going into more minute details, the documents pertaining to this particular branch of anatomy resemble one another so closely that a common model must have existed in antiquity and come down through the Middle Ages to the Renaissance.

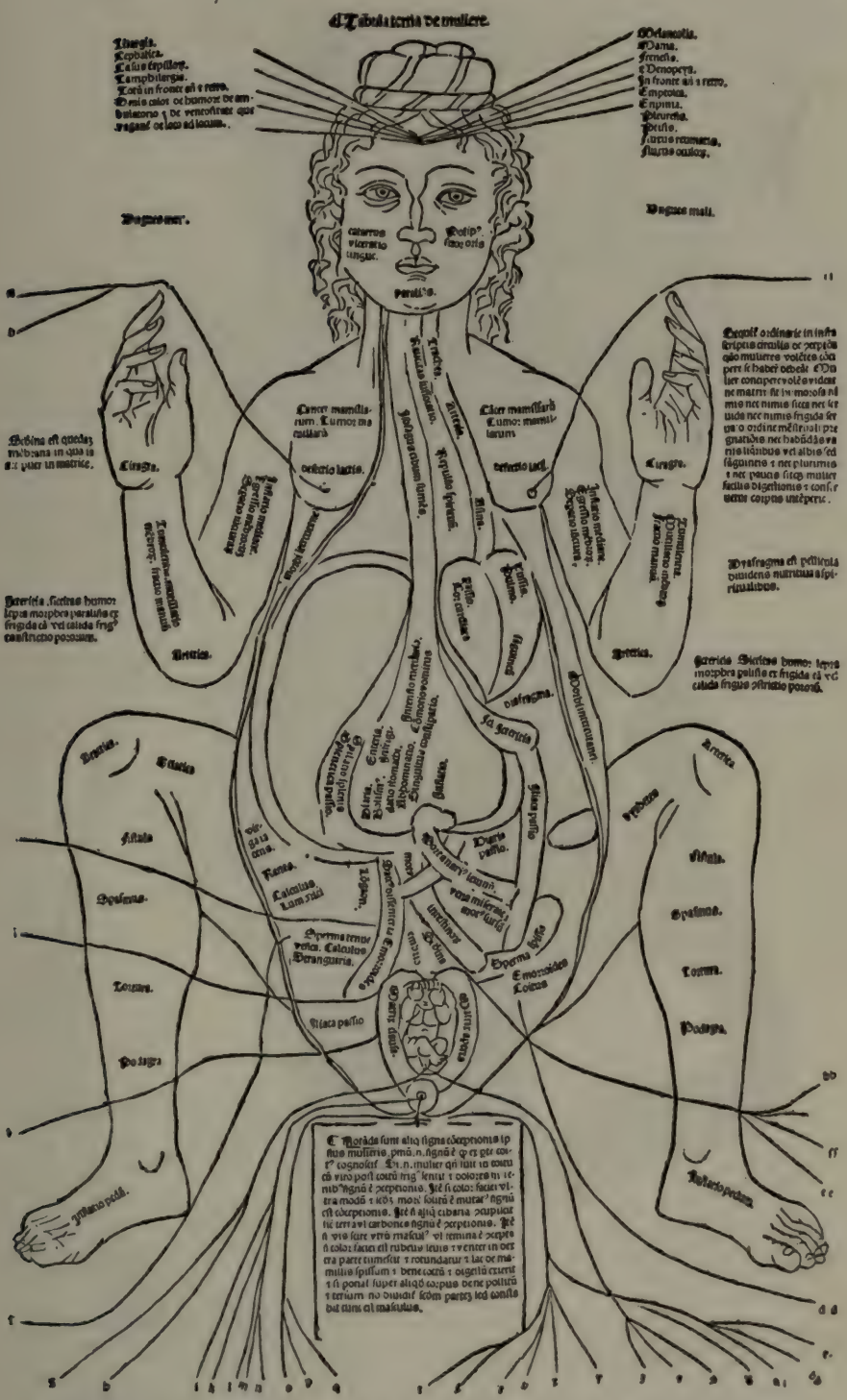
In the first Italian edition (1493) of de Ketham's *Fasciculus*, published by the brothers Gregorii, we have the first autoptic representation of the female viscera in a woodcut engraving, including the *portio vaginalis*. In the Latin, Ketham of 1495, the vagina is split by a frontal section, showing the cervix with the abdominal cavity emptied, to demonstrate the impregnated uterus and adnexa, with the kidneys *in situ*.

Sudhoff brought to light, in 1907, an interesting connection between the printed copies of de Ketham and his MS sources, probably derived from earlier MSS in French, German, and Italian. In a Latin MS (*circa* 1400 A.D.) in the Bibliothèque Nationale there was found a complete series of the Ketham pictures of 1491, and much of the text in the *Fasciculus*. The drawings and the text of the Paris MS are not assembled as in the de Ketham of 1491, but the text is identical in places and the printed figures are evidently copies of the MS sketches. Sudhoff believes that a Johannes de Ketham collected the text and drawings about a century before 1491, and that, when printed for the first time in 1491, they bore his name. Of this, however, there is no definite information.

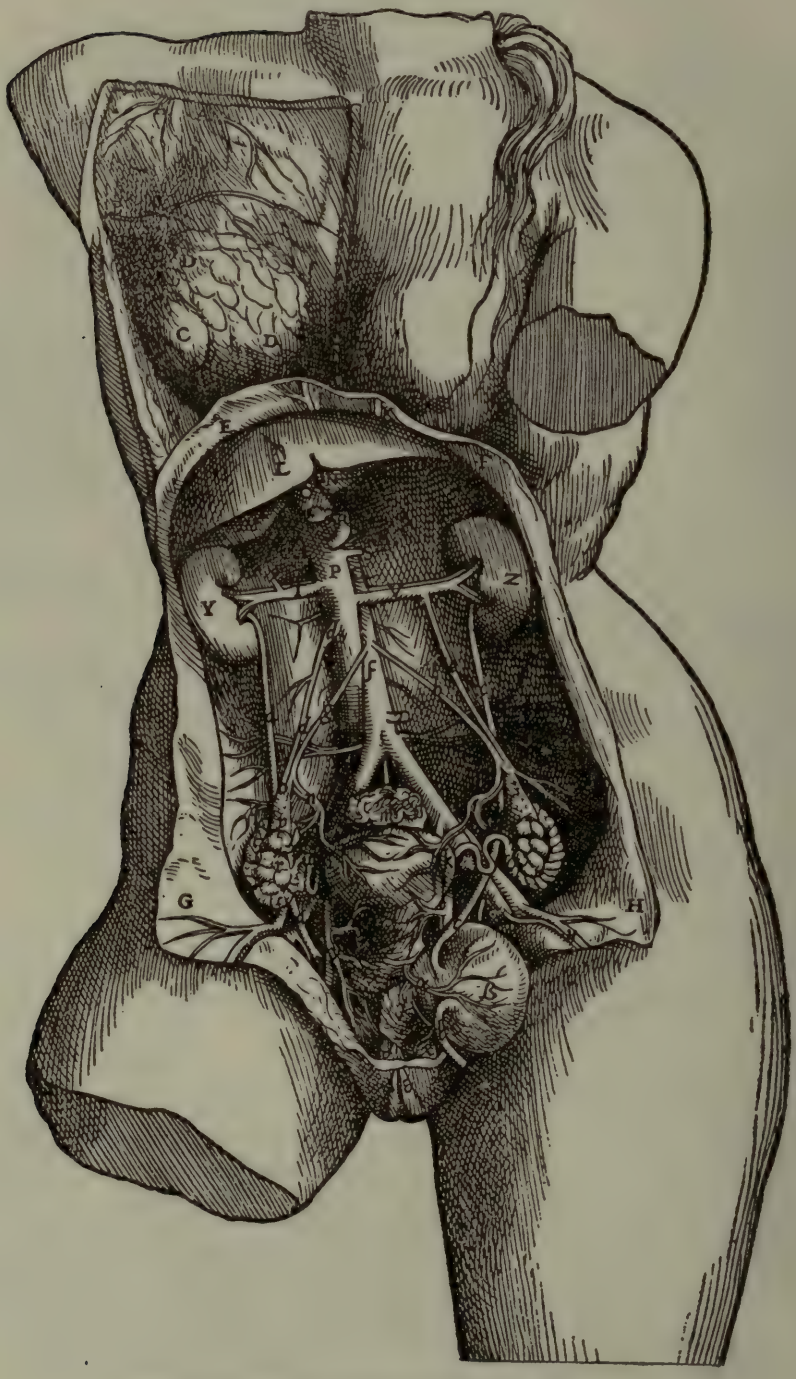
This drawing of the position of the female viscera, but without improvement, was used in 1525 in *Ein gut artzney die hienoch steet*, and again by Reiff in 1541.

Leonardo's great pictures of the female viscera have been preserved in a schematic outline drawing and in another of more finished character. Sudhoff infers that this finished drawing was designed for publication, and the outline drawing, as in modern custom, was to have been used for naming the various organs. This illustration again shows a notable fidelity to nature in its higher form.

Minds of great originality and independence were rare at this time, but in the woodcut in Vesalius' *Fabrica* pertaining to the anatomy of the female, an absolute personal observation of nature is likewise shown in every line. No other picture of Vesalius, however, approaches da Vinci's



SCHEMATA OF THE FEMALE *viscera in situ*, FROM KETHAM'S *Fasciculus medicinae*, VENICE, 1491 A.D. (AFTER WIEGER)



FEMALE VISCERA *in situ*, FROM VESALIUS, 1543 A.D.

drawings so closely as this one, but no one ought seriously to believe that it was borrowed or plagiarized, as his own achievement was so tremendous and limitless.

"The practice of plagiarism was widespread during this period. Publishers and authors engaged in it in a wholesale way; both sketches and text were commonly copied without credit being given. The ethics of the rights of intellectual property were unrecognized. Now and then a touch of original observation was added to the traditional figures, but they were not perfected. Dependence on authority was still the deep-seated method of the intellectual life, and the rise of independent observation was slow. But, the better intellects were opposing it, and with all these limitations the light of the Renaissance was breaking. Dependence on authority was giving way, and, finally, thanks to the work of his predecessors, Vesalius was able to establish a new method based on observation and reason. With the publication of his *Fabrica* in 1543, there was ushered in the era of good illustrations of anatomy. The prevailing mental habit of the time was now at least partly overcome, and the era of independent observation was started."[1]

[1] Locy (William A.): "Anatomical Illustrations before Vesalius," *Journal of Morphology*, XXII, 4 (December, 1911).

MONDINO DE' LUZZI

Mondino de' Luzzi, Mondini, Mundinus, Mundinus de Lentiis, the son of a pharmacist (*speziale*) at Bologna, later anatomist and professor at Bologna, has been recognized as the founder of anatomy in the Middle Ages, since he wrote for his students, in 1316, an anatomic compendium which remained famous until the beginning of the sixteenth century. In the introduction to the book, he says, *proposui meis scholaribus in medicina quoddam opus componere*, "I have proposed to compose a work in medicine for my scholars." He himself dissected two female bodies in 1315, as discussed in the chapter *de vasis spermatis*. He is said to have died in 1318.

[This compendium was without illustrations, at least nowhere does the text refer to any. It met a need universally felt just at that time and commended itself for its brevity, conciseness, and completeness, as well as for the fact that it taught for each separate organ the necessary anatomic technique, as, for example, in the first chapter: *Situato itaque corpore vel homine mortuo per decollationem vel suspensionem supino, etc.*, "accordingly, laying out the body of a man dead by decapitation or hanging, etc."

Regarding the texture of the tissues he says:

De partibus autem licet sint duplices consimiles videlicet et compositae, de simplicibus non ponam distinctam anothomiam, quia earum anothomia non perfecte appareat in corpore deciso sed magis liquefacto in gurgitibus aquarum. Sed ponendo anothomiam membrorum organicorum de consimilibus loquar secundum quod consimile aliquod in aliquo membro organico dominatur: ut de carne in anothomia coxae, de ossibus in anothomia dorsi et pedum et de anothomia neruorum in anothomia cerebri et nuchae.

"As regards the parts, even though they are of two sorts, simple, of course, and composite, I will not set forth a separate anatomy of the simple ones, since the anatomy of these does not completely appear in the case of an ordinary cadaver, but in the case of a body dissolved in an abundance of water. But in setting forth the anatomy of the organic members, I will speak also of the related parts according as each particular part is dominant in the particular organ under discussion. For example, I will speak of the flesh in the anatomy of the hip, of the bones in the anatomy of the back and feet, and of the anatomy of the nerves in the structure of the cerebrum and back of the neck."

After a general introduction dealing with the differences between the human and the animal body and their division, a description of the

different organs is given in the following order: (1) abdominal cavity (*venter inferior*), abdominal muscles, peritoneum, omentum, digestive organs, urinary and sexual organs; (2) thoracic cavity (*medius venter*), the breasts, bones and muscles of the thorax, pleura and diaphragm, heart, lungs, organs of the throat and mouth; (3) head (*venter superior*), skull, the brain and its cortex, eye, ear; (4) bones, spinal column, extrem-

ities, the latter with the muscles. This division into *Membra genitalia*, *naturalia*, *spiritualia*, *animata*, which continued in use up to the seventeenth century, and the custom of the anatomic textbooks of that time of beginning the order with the abdominal cavity were due to the scarcity of cadavers, which necessitated care in spreading the dissection over several days (*Lectiones*). During the first lessons, the abdomen and the viscera were demonstrated, Mondino says, *quia primo illa membra fetida sunt et ideo ut primitus abiiciantur ab eis incipiendum est.* "Since, to begin with, these members are fetid, and on this account we should

make a start with them, in order that we may be able to throw them away as soon as possible"; in the second, the thorax and its organs (*Membra spiritualia*, lungs and heart); in the third, the head and its contents with the sense organs (*Membra animata*), and in the fourth, the extremities, muscles, and bones. Most of the older anatomic compendia, therefore, finish up with osteology. The famous French surgeon Guy de Chauliac, in the fourteenth century, gives the same account: *Et ipsam (anatomiam) administravit multoties magister meus Bertrucius in hunc modum, collocato corpore mortuo in banco* (in other sections *scamno*) *faciebat de ipso quatuor lectiones. In prima tractabantur membra nutritoria, quia citius putrent*, "And my own teacher, Bertrucius, many times conducted an anatomy lesson in this fashion. Placing the dead body on a bench he would give four lectures about it. In the first, would be treated the digestive tract, because these parts rot more quickly," *in secunda membra spiritualia* (respiratory system and heart), *in tertia membra animata* (brain and senses), *in quarta extremitates*, a very expedient method (considering the economic use that had to be made of cadavers rarely obtainable), yet rashly derived in Joseph Hyrtl's *Antiquitates anatomicae rariores*, Vienna, 1835, 8°, page 45, and utterly misunderstood in Burggraeve's *Études sur Vésale*, Ghent, 1841, 8°, page 12.

Everywhere in this compendium the author's own anatomic activity with human and animal cadavers is in evidence. He himself speaks repeatedly of this work, as for instance in the beginning:

Vobis cognitionem partium corporis humani quae ex anothomia insurgit proposui tradere, non hic obseruans stilum altum sed magis secundum manualem operationem vobis tradam noticiam;

"I have made it my purpose to give to you that acquaintance with the parts of the human body which arises from the study of anatomy. In this work I shall not strive for a lofty diction, but will rather acquaint you with the results of a dissection."

And further on in *cap. de anothomia matricis:*

Et propter istas quatuor causas mulier quam anothomizaui anno preterito scilicet 1315 anno christi de mense ianuarij maiorem in duplo habebat matricem quam illa quam anothomizaui eodem anno de mense marcij: potuit esse quinta causa: quam ibi ponit Auicenna, scilicet quia prima erat menstruata: et in tempore menstruationis impinquatur et ingrossatur matrix. Diuersificatur etiam matrix in quantitate ratione generis quoniam matrix plurium generatiui animalis maior est quam matrix unius generatiui, et propterea maior centies erat matrix porce, quam anothomizaui 1316 quam nunquam viderim in femina humana; potuit tamen alia esse causa, quod erat praegnans et in utero habebat 13 porcellos et in ea monstravi anothomiam fetus siue pregnantis, etc.

"And for these four reasons the woman that I dissected last year, that is, in January in the year of our Lord 1315, had a uterus twice as large as the woman that I dissected in the same year in the month of March. There might have been a fifth reason, the one that Avicenna posits in this connection, i.e., because the first of these women had menstruated, and during the period of menstruation the uterus becomes engorged and is enlarged. Then, too, the uterus varies in size by reason of reproduction, since the uterus of an animal that has borne several young is larger than the uterus of the mother of one, and for this reason the uterus of a sow that I dissected in the year 1316 was a hundred times greater than I have ever seen in the female of the human species. Still, there may also have been another reason, because the animal was pregnant and was carrying in her uterus thirteen little pigs, and in the case of this animal I demonstrated the anatomy of the gravid or pregnant female."

This in itself shows the year 1316 as the date of the writing of the book and, at the same time, that Mundinus dissected, in 1316, a pregnant sow and, in 1315, two human female cadavers, the first one of which had menstruated.

The nomenclature is partly Arabic and partly Arabist: *Mirach* = abdominal muscles as a whole, *Siphach* = peritoneum, *Meri* = oesophagus, *Venae guidech* = jugular vein, *Vena chilis* (from χοιλιης) = inferior vena cava, *Caib* = os calcis; other names are in Latin, but differ frequently from the nomenclature of the present, as, for instance, *Pomum granatum* = ensiform process, *Epiglottus* = larynx, *Secundina* and *Aranea* = chorioid and hyaloid of the eye, *Zirbus* = omentum, *Monoculus* = coecum, *Portanarium* = pylorus, *Os laude* = occipital portion of the occipital bone, *Os basilare* = body of the occipital bone with the sphenoid and the petrous portion of the temporal bone, *Os adjutorium* = humerus, *Os femoris* = each innominate bone of the pelvis, *Canna coxae* = femur, *Focilia* = the two bones of the forearm and the leg, *Rascetae* = carpus and tarsus, *Spatula* = scapula, *Furcula* = sternum and clavicle, *Pecten* = metacarpus and metatarsus, *Pars silvestris* = extensor surface, *Pars domestica* = flexor surface. Much attention has been given to zoötomy, physiology, pathology, and operative surgery.

There are a great many different editions, some of them with illustrations, although the original text had none. It is hardly possible to enumerate all of them; only a few of the older and more authentic editions are therefore given.[1]

[1] Besides the 31 editions cited by Choulant, the following list contains 18 not given or unknown to him:

Lipsiae, 1493, 4°, Martin Landsberg, Panzer, I, 480, 63; Hain, 11637.
Lipsiae, 1505, 4°, Panzer, VII, 497, 17.
Venetiis, 1507, fol., Haller.
Papiae, 1507, J. de Paucisdrapis, Stockton-Hough, *Bibliotheca Medica.*
Venetiis, 1508, 8°, italice, Haller.

[*Footnote continued on page 92.*]

1. *Pavia, 1478, fol.*, published by Antonio de Carchano, December 19.

Title: *Anothomia Mundini praestantissimorum doctorum almi studii Ticiensis (Ticinensis) cura diligentissime emendata: impressa Papiae per magistrum Antonium etc. regnante Johanne Galeaz illustrissimo Insubrium duce sexto.* (Panzer: *Annal. typogr.*, II, 246, 8; Hain-Copinger 11634. Proctor 7051.)

2. *Bologna, 1482, fol.*, published by Johannes von Noerdlingen and Henrich von Haarlem, January 20.

Page 1 a (Signature a i): *Incipit anathomia / Mundini. / ( ) Uia dixit / Gal. etc.* colophon page 19 b: *Hec Anothomia fuit emendata ab Exi / mio artium: et medicine doctore. d. Magistro / Petro Andrea morsiano de Ymola in almo / studio Bononie cyrurgiam legente coadiuuanti / bus Mgro Johanne Jacobo caraia de buxelo / Et mgro Anthonio Frascaria Januensi cy / rurgie studentibus. Impressum per Johannem de / / noerdlingen. Et henricum de harlem socios. / Anno dñi. M. cccc. lxxxij. Mense Ja- / nuarij die. xx°.* Gothic type in 2 columns, with signatures, 45 lines, 19 pages, without illustrations. (Panzer: *Ann.*, I, 214, 73; Hain **11635.*)

3. *Padua, 1484, 4°*, published by Matthäus Cerdonis de Windischgrätz.

Page 1 a: *Incipit anothomia Mundini. / (Q) Uia ut ait G. etc.* colophon page 34 a: *Hic modus imponitur anathomie Mundini: que non / paucis in locis emendata fuit per excellentissimum artis et / medicine doctorem magistrum Hyeronimum de Ma- / feis de Uerona impressaque per magistrum Mattheum cerdo- / nis de Uuindiechgretz Padue: Anno dñi 1484.* Gothic type without signatures, catchwords, and pagination; illuminated initials, 34 lines, 34 pages. (Panzer: *Ann.*, II, 375, 72; Hain, **11636;* Proctor; 6818.)

[*Footnote continued from page 91.*]

Argentorati, 1509, fol., Haller.
Venetiis, 1512, 4°, Haeser.
Bononiae, 1514, 4°, Justinianum Rubericum, Panzer, VI, 327, 70.
Rostochii, 1514, fol., Panzer, VIII, 280, 4.
Venetiis, 1521, 4°, Haeser.
Bononiae, 1522, 4° [George Jackson Fisher, *Annals of Anat. and Surg.*, Brooklyn, N.Y., 1880].
Lugduni, 1525, 8°, Haller.
Lugduni, 1527, 24°, Haller.
Lugduni, 1528, 8°, Haller.
Lugduni, 1529, 12°, Haller.
Venetiis, 1538, 12°, Haller.
Lugduni, 1551, 12°, in Matteo Corti, Haller.
Venetiis, 1580, 12°, Haeser.

4. *s. l. et a., 4°. Leipzig,* published by Martin Landsberg.

Page 1 a: Woodcut covering the page: on a chair a man is sitting with coat and high cap, in his left hand an open book, on the left side of the picture a rock and six linden trees, below, on a table, a dissected cadaver, beside its left foot lies a curved knife, to the right of the cadaver stands a young man in a short garment, bare-headed and with long curls, grasping the intestines of the cadaver with both hands; to the left at the top of the picture the following is printed in type: *Anothomia Mun / dini Emendata per / doctorem melerstat;* page 1b: 24 verses: *Est opere pretium—bona cuncta serit,* below them *Martinus mellerstat medicus;* page 2a: *Incipit Anothomia Mundini / ( ) Via ut ait. G. etc.,* concluded on page 39a; page 39b: *Sequitur additio domini gentilis / de fulgineo que est reprobatio ali / quorum dictorum Mundini in ano / thomia prescripta,* concluded on page 40a with 4 verses: *Hic labor expirat—in arte Vale.*; page 40b blank. Gothic type in projecting lines, signatures A * E, 34 lines, 40 unnumbered pages. This edition is also given thus: *Lips. 1493* and *1505 in 4°*, probably an impression by Martin Landsberg of Würzburg, who printed at Leipzig from 1490 to 1512. Martin Pollich of Mellerstadt was professor at Leipzig until 1502; from then on he was professor in Wittenberg where he brought about the founding of the university. He died December 27, 1513. (*Bibl. Rivin.* 2319; Panzer: *Ann.*, I, 480, 502; IV, 345, 342; Hain-Copinger 11633; Proctor 2994.)

5. *Venice 1494, 4°*, published by Bernardinus (de Vitalibus), February 20. Gothic type.

Colophon: *Venetiis per Bernardinum Venetum, expensis Hieronymi Duranti. Mcccc. 94. die 20. Febr.* (according to Panzer: *Ann.*, III, 362 (1850); Hain: 11638, neither saw it). Hieronymus de Durantis lived in Venice in 1493–94, Bernardinus de Vitalibus from 1494 to 1507.

6. *Venice 1498, 4to*, published by Johannes and Gregorius de Gregoriis, brothers.

Title: *Anatomia Mundini emendata a Petro Morisono de Imola impressa per Joh. et Greg. de Gregoriis,* according to Panzer: *Ann.*, I, 214, 73; Hain 11639, both relying on Boerner: *Noctes Guelphicae,* page 177, who claims to have seen the edition in the Rathsbibliothek in Leipzig. Nevertheless, it is probably a new edition of number 2 (Bologna 1482) and the name *Morisonus* is only an error for *Morsianus.*[1]

The woodcuts are better than Hundt's (page 38) according to Boerner; they seem therefore to be anatomic prints. Haller: *Bibl. anat.*, I, 146,

[1] This paragraph ends original.

says of this edition: *cum malis figuris*, "with poor figures." In Morsianus' edition, which appeared in 1482, in Bologna, and which Hain (11635) himself had seen, there were no pictures. There were also none in the edition which was included in Ketham's *Fasciculus medicinae* Venet., 1495, although the publishers were also the Gregorii, known as active promoters of the woodcut in Italy.

7. *Pavia, 1512, 4°*, published by Jacobus de Burgofranco.

With a woodcut illustration of the saints Cosmas and Damianus; cf. von Rumohr: *Geschichte und Theorie der Formschneidekunst*, p. 57. Panzer: *Ann.*, VII, 497, 17.

8. *Strassburg, 1513, 4°*, published by Martin Flach.

Title: *Mundinus / De omnibus humani corporis / interioribus membris / Anathomia.* On the back of the title-page: *Joannes Adolphus Physicus Egregio Leonardo Apothecario, Medico expertissimo, apud Basileam etc. Desideraverunt plerique medicinarum alumni, ut Mundinus ipse physicus preclarissimus, quem omnis studentium vniuersitas, colit ac veneratur vt deum, tandem emendatus in lucem veniat etc.—Vale: Ex Argentina ipso die beatorum martirum testium christi etc. Anno etc. Millesimo quingentesimo Tredecimo;* These martyrs are neither named, nor represented; they are probably the saints and physicians Cosmas and Damianus of the above-mentioned edition, after which this edition may have been printed. The text begins on page 2a: *Incipit anatho/mia Mundini*, and concludes on page 38b. It is followed by the enumeration of the bones, muscles, and nerves. Page 40a: *Impressit Argentine Martinus Flach / Anno domini. M. D. xiij.* Gothic type with signatures A–K: 40 unnumbered pages. The editor Adelphus gave an *Additio* to some passages in the text. One of these (Sign. Fiiijb) is accompanied by a small woodcut printed in the text with reversed letters, and representing the heart, particularly the *Ventriculus medius* which was thought to be between the two halves of the heart, and the orifices of the coronary vessels. The cut does not belong to Mundinus' text. A woodcut representing a man with dissected thoracic and abdominal cavities and a narrow band over his genitals tied at his left hip, is in some copies of this edition on the title-page, in others below the colophon, and in others at both places. Surrounding the man are twelve medallions with the signs of the zodiac from which lines are drawn to the organs of the body ruled by them. There is no lettering either on or around the plate. This illustration appeared also as a fugitive anatomic plate with German verses printed all around the plate. A reversed copy of the plate appeared with the figures of the

signs of the zodiac changed and these words engraved on the plate by the side of each sign: *Bos, Gut, Mittel.* Panzer: *Ann.*, VI, 58, 273.

9. *a* [*Geneva*], *1519*, *4°*, December 20.

Title: *Anathomia Mundini. / En lector libellum Mundini quem de parti- / bus humani corporis inscripsit ab omni er / rore mendaque alienum: nec non cum an- / notationibus in margine positis et / locis vtilioribus Aris. Aui. Ga. ce / terorumque medicorum ubi quod / auctor dicit clarius locis / allegatis videre pote- / ris. Addita est nu- / perrime tabula an / notationum ac / particularum / totius li- / belli.* Page 1b: a woodcut, a reduced reproduction of the dissection from Ketham's *Fasciculus medicinae*, from the inferior plate with a few changes: the platform is decorated differently, the window to the right is without casements, to the left are only two persons, to the right only three, and everything is more crosshatched than on Ketham's plate. The text begins on page 2a, and concludes on page 23b: *Explicit anathomia Mundini. / Impressum Gebeñ. Anno domini. M. cccc. et. xix. / die vero vigesima mensis decembris.* Page 24 contains an index to the chapters, at the end: *Finis tabule.* Gothic type, sign. a–f, no catchword, 49 lines, 24 unnumbered pages. This print is mentioned nowhere and is in the possession of the University Library in Leipzig. It is probably a reprint of Mundinus' text in Ketham with the addition of marginalia containing mostly quotations and indexes.

10. *Marburg*, *1541*, *4°*, published by Christian Egenolph.

Title: *Anatomia Mundini, ad vetustissimorum, eorundemque aliquot manu scriptorum, codicum fidem collata, iustoque suo ordini restituta. Per Johannem Dryandrum Medicum professorem Marpurgensem. Marpurgi, in offic. Christiani Egenolphi.* At the end of 1541; with 46 plates.

11. *Pavia*, *1550*, *8°*, published by Camillo Borio.

Contains a commentary by Matteo Corti (Curtius) consisting of four hundred pages. Cf. Giuseppe Cervetto: *Di alouni illustri anatomici*, Verona, 1842, 8°, page 7; Haller: *Bibl. anat.*, I, 170.

Besides these, Mundinus' text appeared in the following:

a)[1] in Ketham's *Fasciculus medicinae*, *Venet. 1495*, *fol.*, *15 Octob.*; *ibid. 1500*, *fol.*, *17 Febr.*; *ibid. 1500*, *fol.*, *28 Mart.*; *ibid. 1513*, *fol.*, *10 Febr.*; *ibid. 1522*, *fol.*, *31 Mart.*, after the revision which Petrus Andreas Morsianus of Imola prepared in Bologna for the edition of the students, Johann Jacob Cararia (Caraia) de Buxeto and Frascaria of Genoa. In the oldest edition of Ketham, *Venet. 1491*, *fol.*, *26 Julii.*

[1] Boerner: Noctes Guelphicae, p. 177.

Mundinus' text is missing, and with it the illustration of the dissection belonging to the text. No other illustrations, besides this one, accompanied Mundinus' writings in Ketham's compilation. The edition *Venet. 1522* has annotations by Alessandro Achillini.

b)[1] in Jac. Berengarii de Carpi: *Commentaria super anatomia Mundini, Bonon. 1521, 4°, prid. non. Mart.*, distributed in chapters over a very extensive commentary, and as promised in the title: *in pristinum et verum nitorem redactus*. Twenty-one illustrations are here inserted by Berengarius to accompany Mundinus.

c)[2] translated into Italian in *Fasciculo de medicina vulgarizato per Sebastiano Manilio Romano, Venez. 1493, fol., 5 Febr.*, an Italian translation of Ketham's compilation. Mundinus is completely translated, the text begins with sign. f iii, and the dissection from the older and better plate, which was probably used here for the first time, is also inserted.]

[1] Boerner: Noctes Guelphicae, p. 177. [2] *Ibid.*

MARC' ANTONIO DELLA TORRE

Marc' Antonio della Torre, Marcus Antonius Turrianus, of Verona, an anatomist, came from a distinguished Lombardian family alleged to have been of princely descent. His father, Girolano, taught medicine at a very early age at Padua, about 1442, then in Ferrara, and again in Padua after 1487, and died in the month of February, 1505. Of his four sons, Giulio chose jurisprudence, Marc' Antonio, medicine, Giambattista, astronomy, and Raimondo, belles lettres. All won fame in their respective callings.

Marc' Antonio was born about 1473, and took his doctorate degree in medicine and the liberal arts at Padua. About 1501, he lectured there on theoretical medicine, and was soon made professor in ordinary. His fame won him a call to Pavia to establish there a school of anatomy. There he directed attention to anatomic errors, especially of the newer anatomists such as Mundinus, Zerbi, and others, and from whose meager descriptions he probably called attention to the rich, although likewise erroneous, anatomy of Galen. At Pavia he also prepared a great anatomic work, the appearance of which, however, he did not live to see. In the fall of 1506, he was called to Riva di Trento, on Lake Garda, on account of a malicious fever epidemic raging there, and soon after fell a victim to the disease. He died there September 22, 1506 (or 1512), at the age of thirty-three, and was later solemnly interred in Verona beside his father in the church of San Fermo. His likeness can be found in the collections of Reussner and Freher, and also in the work by Cervetto mentioned below. It was copied from a painting by Venuti and lithographed by Guelmi.

None of his writings have been preserved. For his illustrations, he employed the famous painter Leonardo da Vinci, whose work we shall, therefore, mention in another chapter.

Jovius, Paulus: *Elogia virorum literis illustrium*, Basil. 1577, fol.

Chiocco, Andrea: *De collegii Veronensis illustribus medicis et philosophis*, Verona, 1623, 4°, p. 20.

Cervetto, Giuseppe: *Di alcuni illustri anatomici italiani del decimoquinto secolo indagini*, Verona, 1842, 8°, pp. 46–66.

Moehsen: *Bildnisse*, p. 75; *Medaillen-Samml.* I, p. 129 (Rudolphi, *Index numismatum*, Berol. 1825, 8°, p. 120, declares the medal represented there to be spurious).

Hunter, William: *Two Introductory Lectures*, London, 1784, 4°.

Blumenbach: *Introd. in histor. med. litt.*, p. 117; also his *Medicinische Bibliothek*, III, p. 141 and 728.

Marx, Karl Friedrich Heinrich: *Über Marc' Antonio della Torre und Leonardo da Vinci, die Begründer der bildlichen Anatomie; Abhandl. d. K. Gesellschaft der Wissenschaften zu Göttingen*, Göttingen, 1849, IV, 131–48.

Fracastorius, Hieronymus: *Carmen in obitum Antonii Turriani, in Ejusd. et M. Flaminii carmina*, Venet., 1759, 8°, p. 73.

LEONARDO DA VINCI

Leonardo da Vinci, the painter, was born in 1452, in the castle of Vinci in the valley of the Arno. For four years he was a pupil of Andrea Verocchio in Florence, and lived for a time in Rome, until he was called to Milan in 1487. Toward the end of 1499, he went to Florence where he stayed, excepting a short sojourn at Rome, until 1515, when Francis I called him to France. He died at St. Cloud in the year 1518. (According to others he lived from 1443–1519.)

As an artist, he assisted the anatomist Marc' Antonio della Torre (see page 97) for an anatomic work which della Torre intended to publish, but was prevented from finishing by sudden death. Up to the present time these anatomic illustrations have not yet been found.

Of the thirteen volumes of drawings left by Leonardo da Vinci, twelve came into the possession of the Ambrosian Library at Milan, through the gift of Count Galeazzo Arconato, but were taken to Paris in 1796 by the French, from whence only a part of them were returned to Milan.

The thirteenth volume came into the hands of King Charles I of England and now constitutes a part of the Royal Collection of Hand Drawings in England. Charles I kept this volume, together with sketches by Hans Holbein, in a separate closet, and thus this treasure remained hidden in Kensington Castle until the beginning of George III's reign, when Dalton brought it to light and published thirteen engravings from it. This volume of da Vinci's sketches is an imperial folio, bound in calfskin, with the inscription: *Disegni di Leonardo da Vinci restaurati da Pompeo Leoni.* It contains 234 or 235 sheets with 779 sketches done in most varied ways, many with pen on common paper, some with black and red chalk on blue, brown, or red paper, or with metal-point on colored paper, and a few in India ink. Among them are portraits, caricatures, single figures, compositions, riding, fencing, and tournament scenes, horses and other animals, flowers, illustrations pertaining to optics and perspective, to rifle practice, hydraulics, and mechanics. Besides these, there are a large number of very exact drawings of anatomic subjects done with a fine pen and representing chiefly heads, the extremities with their muscles and vessels, the female genitals and the fetus, several of the viscera, and also studies of the

anatomy of the horse. Da Vinci's portrait is also among the drawings. The entire text is written from right to left (in mirror-writing) in a very fine hand. The language is Italian. Cf. *Knox: Great Artists and Great Anatomists, Lond. 1852, 8°, p. 136.*

Another collection of such sketches (at first in the possession of Don Venanzio de Pagave, later in the hands of Giuseppe Bossi) was acquired by the Imperial and Royal Academy of the Fine Arts at Venice, through public purchase from the Abbate Celotti.

Giuseppe Vallardi also collected in his travels about 360 pages of similar sketches by da Vinci.

Vasari (*Vite de' pittori*, Rom., 1759, 4°, II, 8; Firenze, 1568, 4°, III, p. 7) gives exact and instructive information on the way these sketches were made:

Attese di poi (Lionardo) ma con maggior cura alla notomia degli uomini, ajutato e scambievolmente ajutando in questo Messer Marcantonio della Torre, eccellente filosofo; che allora leggeva in Pavia e scriveva di questa materia e fù de' primi (come odo dire) che cominciò a illustrare con la dottrina di Galeno le cose di medicina, e a dar vera luce alla notomia, sino a quel tempo involta in molte e grandissime tenebre d'ignoranza, ed in questo si servi maravigliosamenta dell' ingegno, opera e mano di Lionardo, che ne fece un libro disegnato di matita rossa e tratteggiato di penna, ch'egli di sua mano scorticò, e ritrasse con grandissima diligenza, dov'egli fece tutte le ossature, e a quelle congiunse poi con ordine tutti i nervi, e coperse di muscoli i primi appicati all' osso ed i secondi, che tengono il fermo, e i terzi, che muovono, e in quelli a parte per parte di brutti caratteri scrisse lettere, che sono fatte con la mano mancina a rovescio, e chi non ha praticà a leggere, non l'intende perchè non si leggono, se non con lo specchio. Di queste carte della notomia degli uomini n'è gran parte nelle mani di M. Francesco da Melzo, gentiluomo Milanese, etc.

"He (Leonardo) afterwards gave his attention, and with increased earnestness, to the anatomy of the human frame, a study wherein Messer Marcantonio della Torre, an eminent philosopher, and himself, did mutually assist and encourage each other. Messer Marcantonio was at that time holding lectures in Pavia, and wrote on the same subject; he was one of the first, as I have heard say, who began to apply the doctrines of Galen to the elucidation of medical science, and to diffuse light over the science of anatomy, which, up to that time, had been involved in the almost total darkness of ignorance. In this attempt Marcantonio was wonderfully aided by the genius and labour of Leonardo, who filled a book with drawings in red crayons, outlined with the pen, all copies made with the utmost care (from bodies) dissected by his own hand. In this book he set forth the entire structure, arrangement, and disposition of the bones, to which he afterwards added all the nerves, in their due order, and next supplied the muscles, of which the first are affixed to the bones, the second give the power of cohesion or holding firmly, and the third impart that of motion. Of each separate part he wrote an explanation in rude characters, written backwards and with the left hand, so that whoever is not practiced in reading cannot understand them, since they are only to be read with a mirror. Of these

anatomical drawings of the human form, a great part is now in the possession of Messer Francesco da Melzo, a Milanese gentleman, etc."[1]

This tends to show that there actually existed a reciprocal relationship between della Torre and da Vinci. The former assisted da Vinci in his anatomic studies (for artistic purposes), with anatomic instruction and preparations, while the latter aided della Torre's scientific researches. From what we have learned, it appears that all their efforts benefited the graphic arts, rather than anatomic science. We are, therefore, inclined to regard all these sketches, excepting one only, as studies carried on by the artist with the aid of the anatomist, rather than as drawings done for the benefit and in the interest of anatomic science. At any rate, the sketches done for della Torre's projected anatomic work have not yet come to light.

A great number of da Vinci's sketches, contained in the volumes that were formerly kept in Milan, and now in part held in Paris, were published in

Recueil de Testes de caractères et de charges dessinées par Leonard de Vinci Florentin et gravées par M. le C. de C. (Comte de Caylus) A Paris, chez J. Mariette, 1730, 4°.

This book contains nothing pertaining to anatomy, but merely caricatures of heads. The preface by Mariette, however, contains very valuable remarks on da Vinci. The second edition of the *Recueil de Testes de caractères* was published (in Paris) in 1767, 4°, and here the title-page and the two last plates (chiaroscuro in the edition of 1730) are replaced by copies in the style of aquatint or of sketches by L. Bonnet, cf. Weigel's *Kunstkatalog no. 19402*.

Carlo Giuseppe Gerli: *Disegni da Leonardo da Vinci.* Milano 1784, fol.; edition 2, *con note illustrative da Gius. Vallardi*, Milano, 1830, fol.; with original copperplates from the first edition.

In this second edition we find the following plates of human anatomy: plate 6, three figures representing the muscles of the neck, the shoulders, and the lower extremities; plate 14, the muscles of the breast, the neck, and the upper extremities; plate 8, the muscles of the lower extremities; plates 2 and 13, drawings pertaining to the theory of the proportions of the human body.

A number of drawings on seven plates, taken from the volume of da Vinci's sketches in the possession of the King of England, were published in John Chamberlaine's *Imitations of Original Designs by Leonardo*

[1] (Translation by E. H. and E. W. Blashfield and A. A. Hopkins' *Vasari's Lives of Painters*, New York, 1907.)

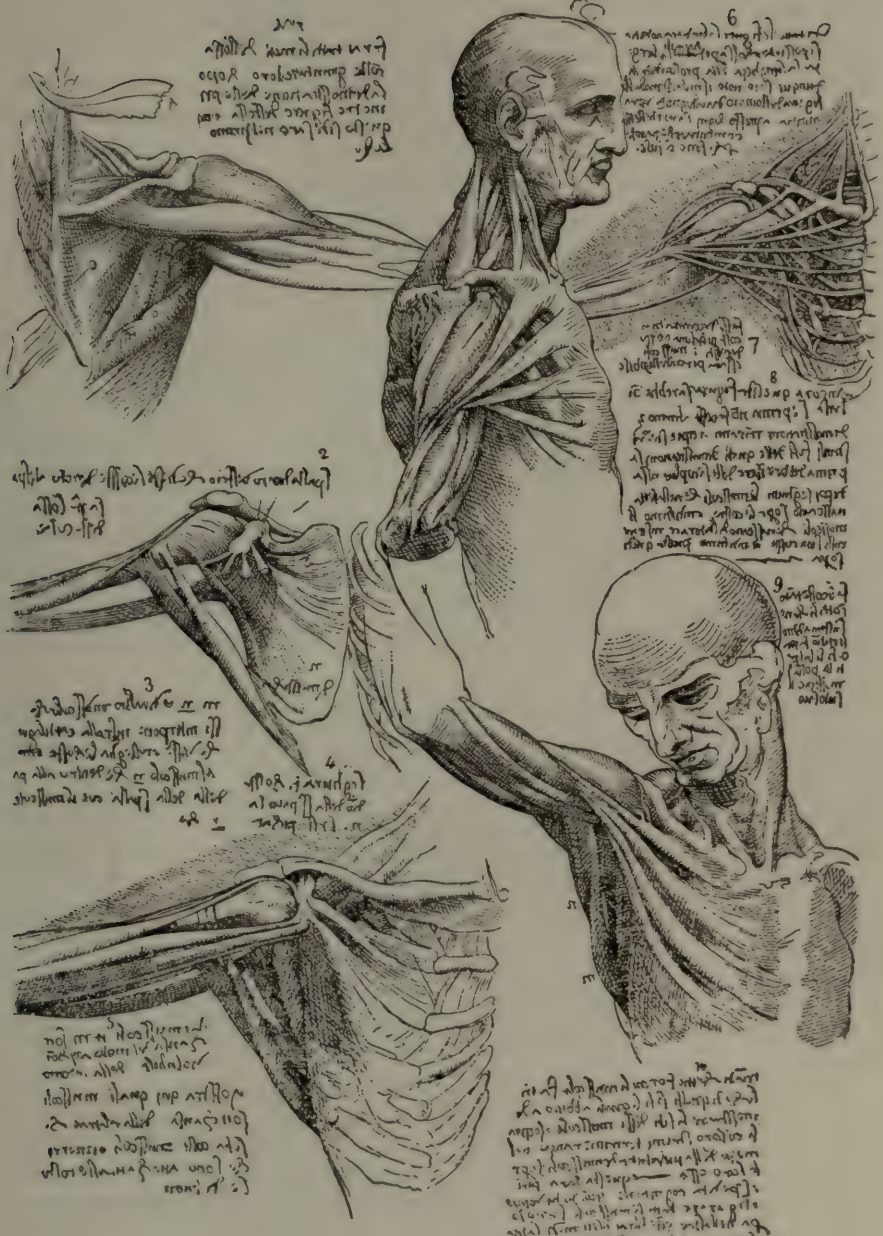
da Vinci, London, 1796, fol., included in John Chamberlaine: *Original Designs of the Most Celebrated Masters of the Bolognese, Roman, Florentine and Venetian Schools*, London, 1812, fol.

Among these are six plates pertaining to osteology and myology for artists. The seventh plate represents a female and male body in sexual intercourse, both cut in a plane through the median line from front to back and from the shoulders down to the lower end of the abdominal cavity. On the same plate there are three more anatomic figures, one of which pictures the digestive organs, another the male genitals, and a third a male torso. To all of them is added a well-nigh undecipherable text in mirror-writing. This copperplate in Chamberlaine's *Imitations*, which probably could also be had separately, is certainly the same which was in the possession of Blumenbach at Göttingen where Fiorillo saw it. (*Geschichte der zeichnenden Künste von ihrer Wiederauflebung bis auf die neuesten Zeiten*, Göttingen, 1798, fig. 8, I, 311.) This same illustration is repeated in

Tabula anatomica Leonardi da Vinci summi quondam pictoris e bibliotheca Augustissimi Magnae Britanniae Hannoveraeque Regis depromta, venerem obversam e legibus naturae hominibus solam convenire, ostendens. Lunaeburgi, 1830, 4°, *sumtib. Heroldi et Wahlstabii, typis exscripserunt Fr. Vieweg et filius.* Brunswigae, four leaves and one lithographic plate.

This is probably taken from Chamberlaine's collection, since nothing is said about its being copied from the original sketch. Nor is there any further comment added, excepting two mutilated passages from Blumenbach's *Introductio in historiam medicinae literariam*, and his *Medicinische Bibliothek*. The contours are nearly the same in both plates, but the crosshatching shows some difference. In the Luneburg plate the left foot of the female figure is complete, whereas it is missing in the Chamberlaine plate. The character of the writing on the plates seems to differ. The anatomy of the internal organs is pre-Vesalian and was not sketched from nature, but merely after descriptions.

The bones and muscles on the other six Chamberlaine plates are drawn with fidelity from nature, and are artistically true and beautiful. Though one must not expect a high degree of anatomic exactness, they are nevertheless better and more exact than the Berengarian representations in the same style. Chamberlaine reproduces the mirror-writing on all his anatomic plates, while it appears on only one of the Gerli plates. In Chamberlaine's collection the drawings and the engraving (by Francesco Bartolozzi) are better than those in Gerli's edition.



Da Vinci, in his treatise on the art of painting (*Trattato della pittura*), refers to a book on human anatomy written by himself, which (chap. 22) contained sketches and in which (chaps. 212 and 223) he promises a volume on the movements of the body and its parts from the anatomic point of view. An extract of this book is said to have appeared under the title of

Fragment d'un traité sur les mouvemens du corps humain et la manière de dessiner les figures suivant des règles géometriques,

which is supposed to have been published in nine folio sheets by E. Cooper, a dealer in engravings in London, at the beginning of the eighteenth century. See Fiorillo, *loc. cit.*, I, 304.

[Etchings after original drawings by da Vinci have been found by Wenceslaus Hollar (b. Prague 1607, d. London 1677) in the collection of Count Arundel. Among them are illustrations of skulls and muscle-heads, also entire musclemen. Cf. Sotzmann in *Deutsches Kunstblatt*, 1852, no. 2, page 17. The library of the Venetian Academy possesses drawings of the human figure by da Vinci illustrating Vitruvius, including the Italian translation of this author made by da Vinci, allegedly from a better text of Vitruvius than is now in existence. Both the drawings and the text have recently been published by Joseph Bononi in London.

There should also be mentioned here Venturi's *Essai sur les ouvrages physico-mathematiques de L. da Vinci, avec des fragmens tirés de ses manuscrits apportés de l'Italie*, Paris, 1797, 4°, A. F. Rio's *Léonard de Vinci et son école, Paris, 1855, 8°*. Weigel: no. 20961. A comparison of da Vinci with Buonarroti and Raphael is given in *Knox: Great Artists etc.*, pp. 133 ff.]

Besides the writings quoted in this article and the one on della Torre, see also the following:

Vasari: *Vite de' pittori*, Rom. a, 1759, 4°, II, 1 *et seq.*

Rogers, Charles: *A Collection of Prints in Imitation of Drawings*, London, 1778, I. 1 ff.

Ottley, William Young: *The Italian School of Design: Being a Series of Fac-similes of Original Drawings by the Most Eminent Painters and Sculptors of Italy*, London, 1823, f., p. 17 ff.

Von Gallenberg (Count Hugo): *Leonardo da Vinci*, Leipzig, Friedrich Fleischer, 1834, 8°; with Leonardo's likeness and 4 lithographs, among them a drawing illustrating the proportions of the head and chest.

Rigollot: *Catalogue de l'œuvre de Leonard da Vinci*, Paris, 1849, 8°.

[Da Vinci (Leonardo): *I manoscritti di Leonardo da Vinci della reale biblioteca di Windsor. Dell'anatomia fogli A. Pubblicati da Teodoro Sabachnikoff, transcritti e*

annotati da Giovanni Puimati, con traduzione in lingua francese. Preceduti da uno studio di Mathias Duval, folio, Paris, E. Rouveyre, 1898.

———*Fogli B*, Turin-Rome, 1901.

———*Quaderni d'anatomia. Fogli della Royal Library di Windsor. Pubblicata da Ove C. L. Vangensten, A. Fonahn, H. Hopstock. Con traduzione inglese e tedesca*, 6 vol. Christiania, J. Dybwad, 1911–16.

———*Notes et dessins. Feuillets inédits, reproduits d'après les originaux à la Bibliothèque du château de Windsor*, 12 vol. fol. Paris, E. Rouveyre, 1901. This contains facsimiles of the whole Windsor Codex but without transcription or translation. With the Quaderni edition completed, this edition is now obsolete, but not the *Dell'anatomia fogli A e B.*]

[Leonardo made over 750 separate anatomical sketches, an exhaustive account of which would be far beyond the scope of this book, indeed would fill a volume. They include not only the extensive studies of skeletal and muscular structures above indicated, but also drawings of the heart, the lungs, the nerves and blood vessels, the viscera and the brain, executed with wonderful fidelity to fact, and with marginal comments which make Leonardo the founder of iconographic and physiological anatomy. In scientific accuracy, these drawings eclipse those in Vesalius and are not approached in artistic beauty by anything before the time of Soemmerring and Scarpa. The correct curvature of the spine and the true position of the *foetus in utero* are delineated for the first time, as also the atrio-ventricular band of the right heart, which Sudhoff has named after Leonardo. Leonardo made cross-sections and casts of the ventricles of the brain, studied the antagonistic action of muscles by means of tape models, made orthogonal projections of the unrolled valvular structures of the heart and investigated the hydraulics of the blood-current. He was the founder of physiological anatomy. For a full account of the *Quaderni*, see M. Holl: *Arch. f. Anat.*, Leipzig, 1905, 111; 177: 1910, 115; 319: 1913, 225–94: 1914, 37–68; 1915, 1–40. Also K. Sudhoff: *Arch. f. Gesch. d. Med.*, Leipzig, 1907, I, 67; 317. Also A. C. Klebs: *Bull. Med. Hist. Soc. Chicago*, 1916, 66–83; and *Boston Med. and Surg. Journal*, 1916, CLXXV, 1; 45.]—F. H. G.

MICHELANGELO BUONARROTI

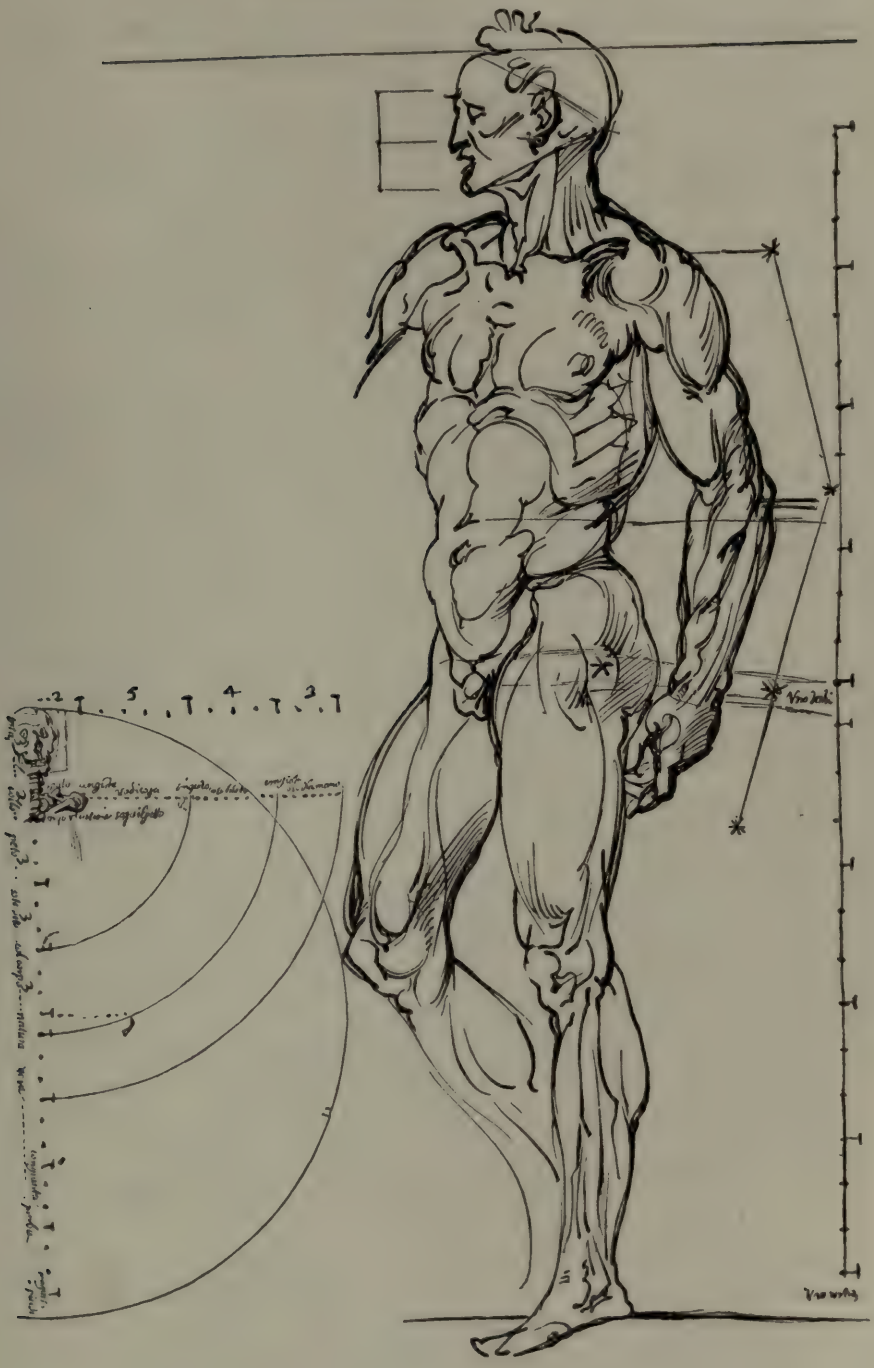
Michelangelo Buonarroti, painter, sculptor, and architect, whose family name originally was Canossa, was born in 1474, at Caprese, worked mainly in Florence and Rome, and died in the latter city on February 17, 1564. He occupied himself with anatomy more than many other artists, particularly while engaged in making a crucifix out of wood for the church of the cloister of San Spirito in Florence, and when living there was well supplied with cadavers for his study. For twelve years he pursued his anatomic studies while completing his artistic training, both in Florence and in Rome. Special mention should also be made of his acquaintance with the famous anatomist Matteo Realdo Colombo (Realdus Columbus), who died in Rome in 1559.

Among the works to be mentioned here are the following:

A sheet in Seroux d'Agincourt's *Histoire de l'art par les monumens*, etc., Paris, 1811 ff., fol., tom. VI, pl. 177, representing the opening of a dead body. The body lies stretched out on a table from which the right arm hangs down, and in the middle of the lower part of the chest a candle is placed, the only source of light. At the head of the cadaver a man stands holding in his right hand a large compass pointing downward. At the foot, on the left side of the body, stands another man, pointing with his right index finger to the right flank of the corpse and holding in his left hand a large broad knife with its point turned upward. The whole picture is sketched boldly and is rather gloomy and appalling to look at.

A sheet in the same work, pl. 178, with five different studies of the human body, only one of which concerns us, viz.: a representation of the back and the gluteal region, and of the left side of the body and a part of the left upper arm. The muscles of the back are removed so as to show the ribs and the intercostal muscles and the posterior wall of the abdominal cavity down to the hip bone. A hasty sketch.

A sheet in imperial folio, engraved by Giovanni Fabri, a Bolognese engraver. The signature is, *Dal disegno originale di Michel Angelo Bonarota*, etc. It is dedicated to King Stanislaus August II of Poland by Francesco Albergati Capacelli; below, on the right-hand side, *G. Fabbri f.* It represents a three-quarter view of a man standing. His head is in profile; of the right arm only the shoulder is drawn, the arm



itself being left out. The right tibia and foot are incomplete toward the end. The skin is not dissected off, but the muscles stand out very clearly. The left hip joint is indicated with a star. On the right side of the picture is drawn a graduated scale for the whole figure, and a separate scale for the left arm. In the left-hand corner of the picture we see a smaller drawing illustrating the proportions of the human body, and drawings of a skull, the cervical vertebrae, the first rib, a clavicle, and the upper part of the shoulder blade. The proportions of the arm as compared with the median line of the body are marked off by means of three quadrants. A semicircle is drawn from the crown of the head to the sole of the foot, with the body height as the diameter. The names of the parts and the numbers are written in Buonarroti's own script. The drawing as well as the engraving is very beautiful and clear. It is a pen drawing. The sheet is very valuable and also very instructive, since it gives exact information as to Buonarroti's conception of the proportions of the body. As Stanislaus August was king of Poland from 1705 to 1736, the sheet must have been engraved within that period.

A sheet in Vivant Denon's *Monumens des arts du dessin chez les peuples tant anciens que modernes*, Paris, 1829, large fol., pl. 76 (described in the text on page 75), drawn by Dubois de Beauchene after a pen drawing in the collection of Baron Denon. It represents a sitting male figure, with the muscles of the back, the left arm, and the left side beautifully and clearly worked out. On the same sheet is a torso, with head and one arm.

A copper engraving with two standing male figures and the corresponding skeletons is often included in this group of sheets; but it really has nothing to do with Buonarroti and is the work of the painter Rosso (Maître Roux). (See article p. 113.)

There should also be mentioned what Moehsen (*Bildnisse*, p. 79) has given us on Buonarroti and his anatomic drawings.

Condivi, Ascanio: *Vita di Michelagnolo Buonarroti*, Roma, 1533, fol., Firenze, 1746, 4°.

Vasari: *Vite de' pittori*, Roma, 1759, 4°, T. III, 185, *et seq.*

RAFFAELLO SANTI

Raphael Santi (Sanzio), the most perfect painter of modern times, also an architect, was born in Urbino on March 28, 1483, on Good Friday; and died in Rome on April 6, 1520, on Good Friday. He was a pupil of his father, Giovanni Sanzio or Santi, and of Pietro Vanucchi, in Perugia, and later on was chiefly active in Rome and Florence.

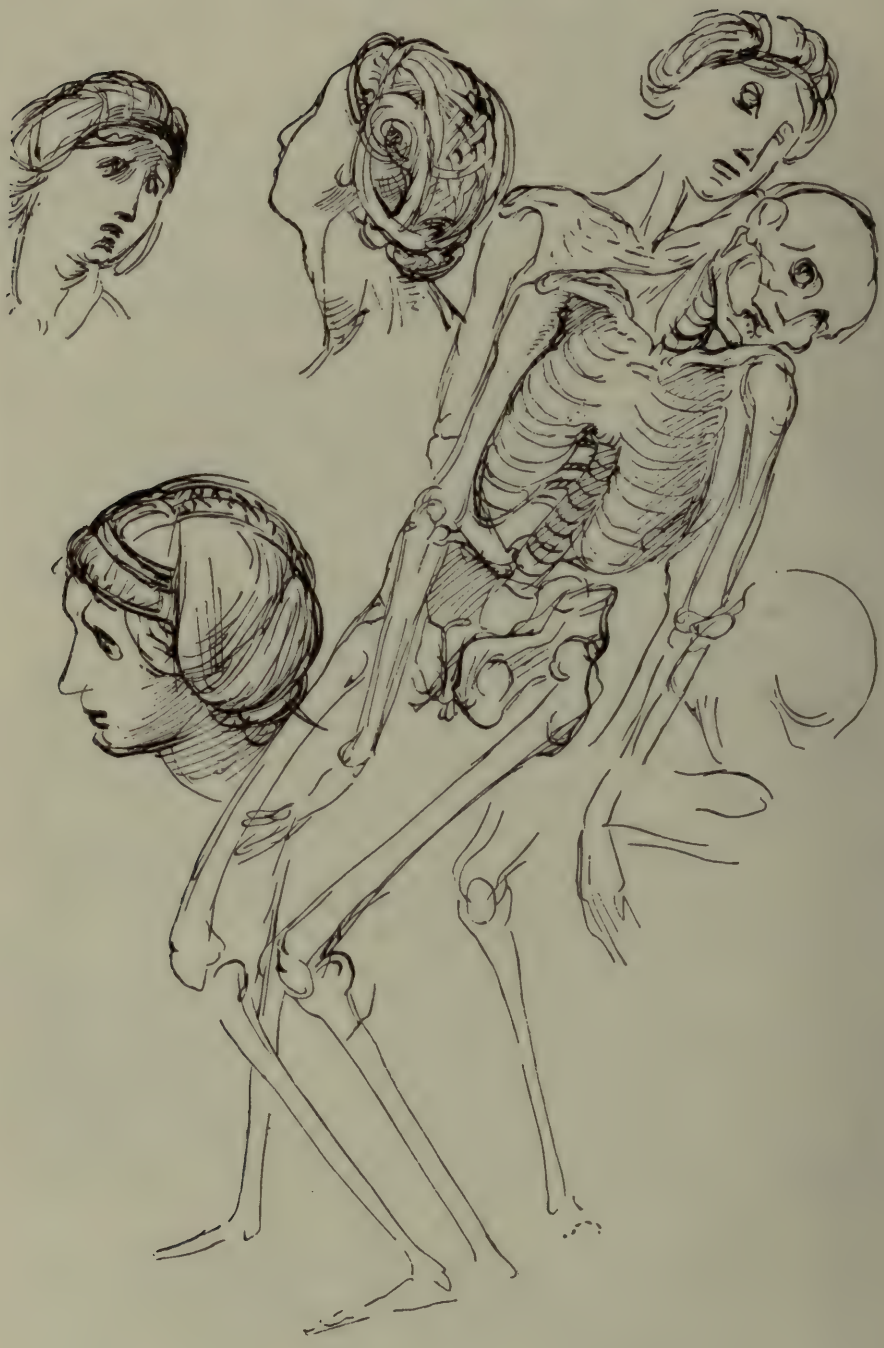
On his anatomic studies Vasari writes:

Datosi dunque allo studiare gl' ignudi ed a riscontrare i muscoli delle notomie, e degli uomini morti e scorticati con quelli de' vivi, che per la coperta della pelle non appariscono terminati nel modo, che fanno levata la pelle, e veduto poi in che modo si facciano carnosi e dolci ne' luoghi loro, e come nel girare delle vedute si facciano con grazia certi storcimenti, e parimente gli effeti del gonfiare ed abbassare ed alzare o un membro o tutta la persona, ed oltre cio l'incatenatura dell' ossa, de' nervi e delle vene, si fece eccellente in tutte le parti, che in un ottimo dipintore sono richieste. Ma conoscendo non di meno, che non poteva in questa parte arrivare alla perfezione di Michelagnolo, come uomo di grandissimo giudizio considerò, che la pittura non consiste solamente in fare uomini nudi, ma ch' ella ha il campo largo, etc.

"But he thenceforth devoted himself to the anatomical study of the nude figure, and to the investigations of the muscles in dead and excoriated bodies as well as in those of the living; for in the latter they are not so readily to be distinguished, because of the impediment presented by the covering of the skin, as in those from which the outer integuments have been removed; but thus examined, the master learnt from them in what manner they acquire fulness and softness by their unity each in its due proportion, and all in their respective places, and how by the due management of certain flexures, the perfection of grace may be imparted to various attitudes as seen in different aspects. Thus also he became aware of the effects produced by the inflation of parts, and by the elevation or depression of any given portion or separate member of the body or of the whole frame. The same researches also made him acquainted with the articulations of the bones, with the distribution of the nerves, the course of the veins, etc., by the study of all which he rendered himself excellent in every point required to perfect the painter who aspired to be of the best: knowing nevertheless, that in this respect he could never attain to the eminence of Michelangelo; like a man of great judgment as he was, he considered that painting does not consist wholly in the delineation of the nude form, but has a much wider field." (Translation by E. H. and E. W. Blashfield and A. A. Hopkins: *Vasari's Lives of Painters*, New York, 1907.)

Nevertheless, we find in the collections of his sketches a number of anatomic studies either for known paintings or of a general nature, namely:

1. In the Academy of Graphic Arts in Venice, four pen drawings: (*a*) An anatomic study of a torso with thighs. Passavant II, 470, no. 30; (*b*) A wrinkled hand of an old person, seen from the palm, a



study from nature, p. 476, no. 87; (*c*) Three arms, a study drawn with the pen and shaded, p. 476, no. 89; (*d*) A man's chest, with the addition of one arm and a torso done by another hand, p. 476, no. 90.

2. In the collection of the Archduke Carl at Vienna. Studies from the body of a bearded man; beside him a youthful head turned in the same direction, and the upper part of a boy's body; two children's heads, one of which is crossed out—a hasty pen sketch, p. 521, no. 259.

3. In the collection of Wicar at Lille: (*a*) Anatomic studies in pen: One whole figure, two arms, and one foot, p. 610, no. 517; (*b*) Anatomic studies in pen, p. 612, no. 534.

4. In the collection of Sir Thomas Lawrence in London: (*a*) Anatomic studies: Two feet and one head, a pen sketch from Antaldo Antaldi's collection, p. 577, no. 418; (*b*) A group of women at a burial in the Palace of Borghese, 12 inches high, 8 inches wide, p. 557, no. 342.

This latter sheet, which is also in the collection of the Marquis Antaldi in Pesaro, and which is hastily sketched with a pen, contains the group of the fainting Mary supported by three women. Within Mary's body the whole skeleton is drawn with rapid pen strokes, outlining the bones and their connections in good proportion. Considering the utter passiveness of Mary's body, more emphasis was placed upon mass than upon active motion. The sketch, therefore, emphasizes the skeleton and its passive position rather than muscle. Of the figure behind Mary only the head, the neck, the right shoulder, the right arm, the left knee, and the lower parts of both legs are outlined. At the neck and the shoulder the muscles are indicated, of the feet only the bones are very hastily suggested. On the same picture three women's heads are also sketched without any anatomy.

This sheet came from the collection of the Marquis Antaldo Antaldi of Pesaro into the possession of Sir Thomas Lawrence, president of the Royal Academy in London. After the latter's death, in 1830, in London, it was acquired by Woodburn Brothers, art dealers of London, who purchased Lawrence's entire collection for £20,000 sterling. Later this anatomic sheet, together with other sketches, passed into the possession of the Prince of Orange, afterward King of the Netherlands. It was auctioned at The Hague on August 12, 1850, after the King's death, and sold to Mr. Leembrugge of Amsterdam for 1230 florins.

An engraved copy of this drawing can be found on plate 8 of the following work:

Lawrence Gallery: A series of Fac-similes of original drawings, by Raffaelle da Urbino, selected from the matchless collection formed by

Sir Thomas Lawrence, late President of the Royal Academy, London, published by S. and A. Woodburn, 1841, fol., 8 leaves of text and 31 etchings.

All the excellent engravings are facsimiles of Raphael's own drawings. Lawrence died at London in 1830. See Weigel: *Kunstkatalog*, no. 15453.

The Academia di San Luca at Rome preserved a skull which was erroneously taken to be Raphael's. Of this several plaster casts were made and circulated. But in September, 1833, Raphael's grave in the Pantheon of Agrippa, which hitherto had not been opened, was visited. According to a report by Vasari, the grave was supposed to be underneath a statue of Maria del Sasso (Sanzio) erected by Lorenzo Lotti. The grave was found on September 14, 1833, covered by a low arch especially built for the grave. On the arch rested the statue. The skeleton and the prominent larynx were well preserved. The skull had twenty-nine beautiful white teeth, and only the back part of the head showed slight effects from water which had entered the grave. The height of the skeleton was seven palms and six inches, or nearly five feet, two inches, Parisian measure. Plaster casts were made of the skull, the right hand, and the larynx. They were then deposited with the other remains in a sarcophagus presented by Pope Gregory XVI, and reinterred in the place in which they were found, on October 18, 1833. There are in existence drawings by Vincenzo Cammucini representing the skeleton, the grave, and the sarcophagus. They were lithographed by Giambattista Borani and supplemented by a description of the foregoing incident.

Passavant, J. D.: *Rafael von Urbino und sein Vater Giovanni Santi.* Two parts with 14 illustrations. Leipzig, 1839, 8° and fol.

Vasari: *Vite de' pittori.* Rom. 1759, 4°, II, 88 *et seq.*

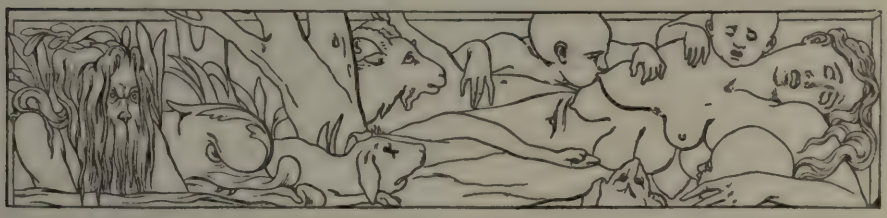
ROSSO DE' ROSSI

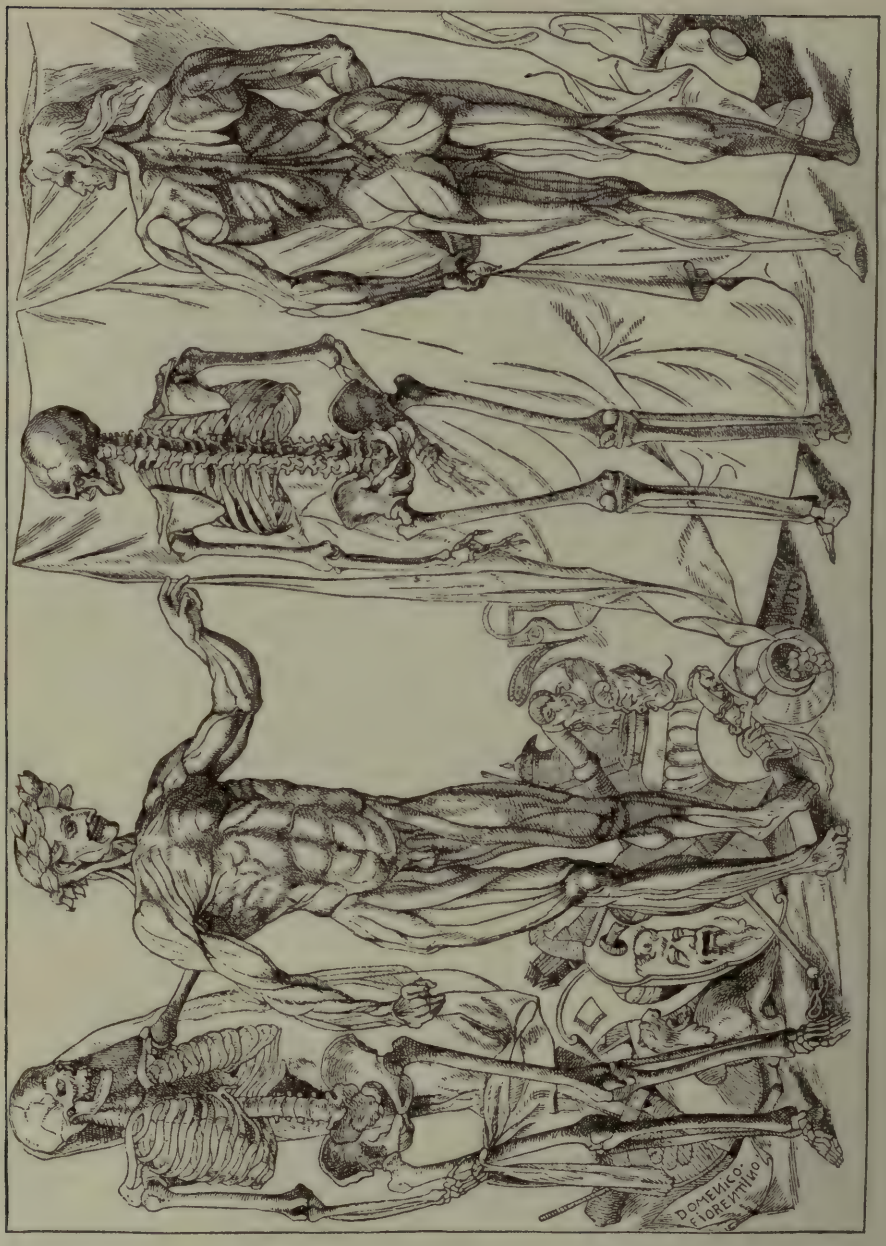
Rosso de' Rossi, Il Rosso, Maître Roux (Rous), painter, was born in Florence in 1496, took poison in 1541, and died at Fontainebleau. He was a pupil of Andrea del Sarto, worked in Florence and other Italian cities and went to France in 1530, where, with Primaticcio and other artists at Fontainebleau, he was given commissions by King Francis I. He was on friendly terms with Benvenuto Cellini in Italy, but in France the two seem not to have gotten along well.

(*Vita*, Lips., 1833, 12°, I, 41, 48, 187; II, 129.)

Of his works, mention is made of a copper engraving, 8 inches, 9 lines high, and 12 inches, 3 lines long, which represents the upper layers of muscles of two standing male figures and their skeletons. The left-hand figure shows the front view, the right-hand figure a back view; weapons and vessels constitute the accessories in the picture. This sheet is one of Rosso's, judging from its drawing. It was, however, engraved by his student and assistant, Domenico del Barbiere, also known as Domenico Fiorentino, who was born about 1506 in Florence and worked with Rosso at Fontainebleau. In the left inner corner of the plate we read: Domenico Fiorentino; Rosso is not mentioned. The drawing of this very rare and precious sheet, which is in the Cabinet of Etchings at Dresden, has been erroneously ascribed to Michelangelo Buonarroti, but it belongs to an anatomic sketchbook which Rosso intended to edit for Francis I, but which was never completed on account of his death.

Vasari: *Vite de' pittori*, Rom. 1759, 4°, II, 293 *et seq.*
Monier, P.: *Histoire des arts, qui ont rapport au dessein*, Paris, 1698, 8°, p. 308.
Bartsch: *Peintre graveur*, Vienne, 1818, 8°, XVI, 359.
Moehsen: *Bildn.* p. 78.
Weigel: *Kunstkatal.* no. 20608.




DOMENICO
FIORENTINO

JOHANNES DE KETHAM

Johannes de Ketham, a German physician, living in Italy toward the end of the fifteenth century, edited a collection of current writings by medical men of his time for the use of practicing physicians, and gave it the title *Fasciculus Medicinae.* In this book we find the very first anatomic illustrations of any kind, and the first wood engravings. All the different editions of this work are of great importance because of the woodcuts they contain. The latter are in the peculiar manner of upper Italy, and especially that of Mantegna, but are of different values and are not the same in the various editions. The best-known editions are the following:

Venet., 1491, fol., impr. per Johannem et Gregorium fratres de Forlivio, die 26. Julii.

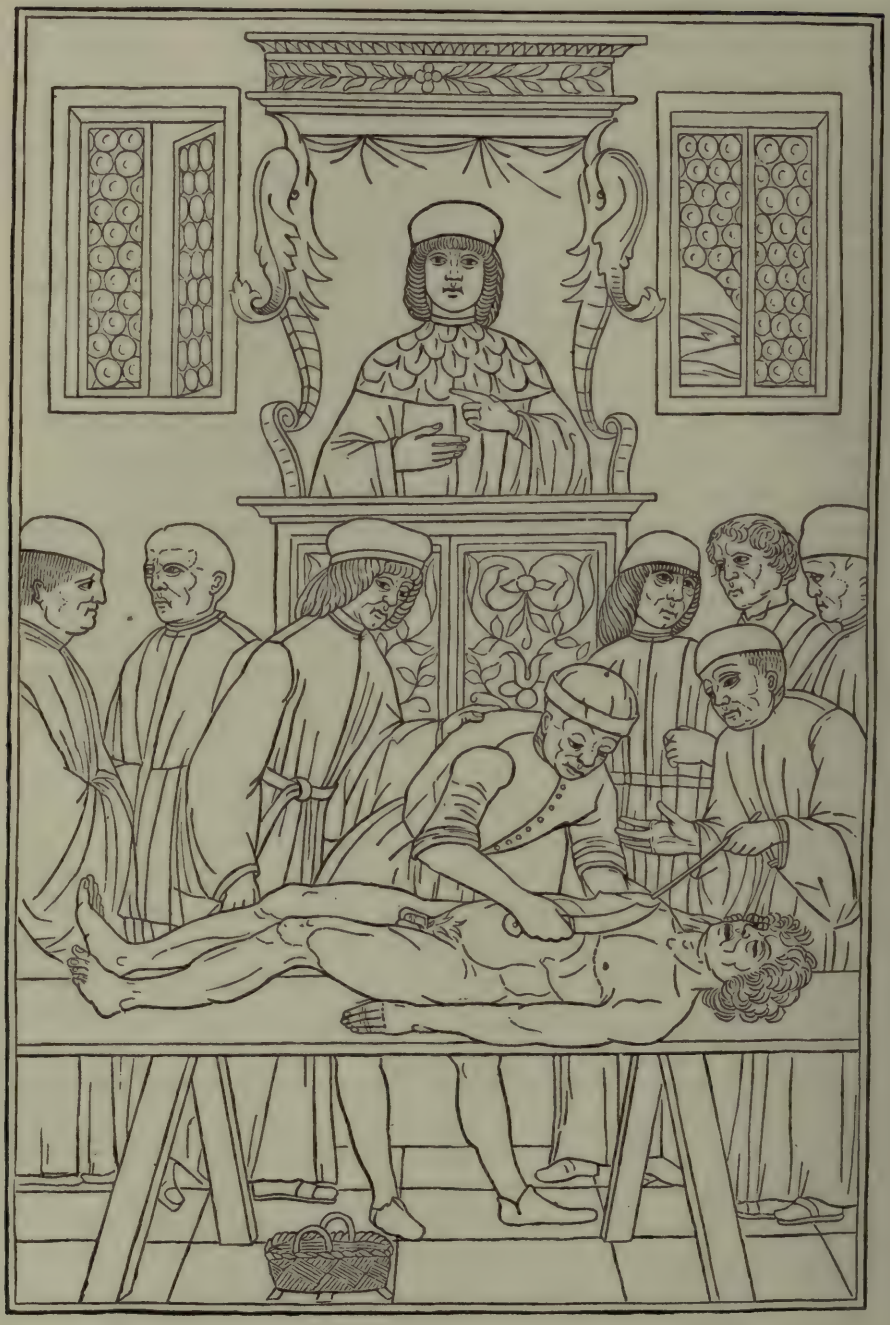
This Latin edition is the first edition. It is of larger size than the later ones, and contains larger woodcuts, twelve and one-half inches to fourteen and one-half inches high, and eight to nine inches wide. Page 1a is blank; page 1b bears the title *Fasciculus Medicinae* in red Gothic character; page 13b, the colophon: *Finis fasciculi medicine Johannis de ketham. Reuisus per georgium de mon-teferrato Artium et medicine doctorem*, etc. Then follow pages 14 and 15: *Consilium Petri de Tausignano pro peste evitanda* is the conclusion of page 15b. Page 16 is blank. Gothic type in two columns with signatures. Pages 14 and 15 are in smaller type and without signatures. The book contains the following illustrations: Page 1b shows four small circles in the corners, with descriptions of the four temperaments. In the center there is a larger circle with twenty-one urine glasses intended for illumination. Two of the lower ones contain black urine, represented directly by means of the woodcut. In the center field there are eight smaller circles printed in red. The same type is used under each urine glass. Page 2b bears the title *Tabula secunda De flobotomia* and shows the bloodletting man (*Aderlassmann*), a large male figure, upon whose various parts are printed the names of the twelve signs of the zodiac. The places for venesection are marked with dots and lines running out into the margin. The margin contains printed explanations in little squares. The whole page is longer than the other pages and folded in at the bottom. Page 5a bears the title *Secunda tabula fleubotomie*, etc., and shows a large

male figure over which the pictures of the signs of the zodiac are distributed. At the bottom there is a landscape with trees, and at the left a landscape with a mountain. Around the figure are quadrangles containing explanations. This page is also folded in at the bottom. Page 5b, with the title *Tabula tertia de muliere*, illustrates the picture of a sitting woman with her thoracic and abdominal cavities cut open, of the size of the woodcuts mentioned above. In the abdominal cavity we see the opened uterus with a cowering fetus. On the whole, this illustration is a crude picture of the thoracic and abdominal cavities, arbitrarily sketched, without any truth to nature. On the various parts of the figure are named the diseases these parts are liable to, sometimes also the name of the part. Both sets of names are printed on the figure. Explanations are given in the margin. On this page, too, the lower margin is folded and printed on. Page 9a, with the title *Tabula quarta De Cyrurgia*, shows a man, on whose various parts possible injuries are indicated, and the inflicting weapons, such as daggers, clubs, knives, arrows, etc., pictured. Diseases are also named, such as bubo, smallpox, warts, etc. The names of the internal parts of the thorax on the abdomen are printed on the figure itself. In the margin, explanations are also printed. This figure is smaller than the others, and the sheet, therefore, is not folded. Page 12a bears the title *Tabula quinta De anathomia*, and shows a male figure, drawn a trifle better and covered more sparingly with names of diseases, most of which are printed on the side margins of the sheet. At the top we find four circles and within the circles printed lists of the psychic powers. This sheet also is not folded. (See Hain: *Repert. bibliogr. 9774;* Weigel: *Kunstkatalog*, no. 12257; Panzer, III, 295, 1354.)

Venet., 1493, fol., stampito per Zuane e Gregorio di Gregorii, a di 5, Februario; Italian translation.

The format is shorter and narrower than the foregoing edition. The drawing and the engraving of the figures (ten and a half inches high, seven to seven and a half inches wide) are better. On page 52a we find the colophon: *Qui finisce el Fasciculo de medicina Vulgarizato per Sebastiano Manilio Romano E stampito*, etc., *in Venexia*, and on page 46b, the index. The printing throughout is round black type; Gothic characters occur only in the marginal explanations of the illustrations. The lines are complete; a full page has forty-eight. There are forty-six pages, and signatures from *a* to *i*. Page 1a is a woodcut; at the top is a library shelf, with eight books, on which the names of the authors appear in woodcut letters. Beneath it is engraved in large letters, *Petrus de*

Montagnana. In the center of the plate we observe a half-length portrait of a man; on his right side a window and a desk with one book; on his left side (the right-hand side of the picture) a larger desk with an open volume of Pliny; in the centerfield there are bookcases; the middle one is open. In the lower part of the picture sits a sick man with a stick in his right hand and a woman with a rosary in her left hand. Both have baskets at their side. On the right we see a young man entering, with a stick in his right and a small basket in his left hand. Page 1b is also a woodcut. At the top, three medallions, and below them two windows; in the window at the right a person looking out. At the bottom, six figures, one of which, at the right-hand margin, holds a urinal. All are beardless and wear headdresses. Before them stands a bare-headed boy, who also holds a urine flask. On page 2a, the circle with the twenty-one urine flasks and the inclosed smaller circles have Gothic printing inside. Everything is smaller than in the first edition. For page 4a the same plate is used that was used for page 12a of the former edition. This is the only plate that has been used unchanged in this translation. On page 8a, the woodcut of the man with the pictures of the signs of the zodiac is reduced, but better engraved. The landscape has been left out. The bloodletting manikin on page 8b has been redrawn and improved upon. Nothing is printed on top of the figure itself. The man on page 12b with the wounds has also been redrawn. On page 19 we should find "*La figura della matrice trata dal natural*," according to the index, but the sheet is missing in this copy. Page 20a, a person infected with the plague; a picture that was not in the first edition and belonged to the *Tausignano*. The woodcut covers the entire page. It represents the following scene: A sick person, covered up to his chest, but otherwise bare, lying in bed. At his right are three women. The middle one holds a dish, while at the left stands a physician holding a sponge in front of his mouth and feeling the pulse at the right wrist of the patient. At either side of the physician stand two young men with burning torches in their hands. The one at the physician's right carries, besides, a small basket. At the bottom, to the right, sits a cat. On page 26b, we find another picture which did not appear in the first edition. This illustration also covers the entire page. It represents the opening of a cadaver, appearing for the first time in this edition, and precedes the one in the *Anatomia Mundini*. At the top a lecturer's chair; in the chair a youthful-looking, beardless man, with headdress, lecturing and raising his left hand above his right. On either side of the chair we see a window, composed of a great number of small round



windowpanes. The window at the left is ajar; the window at the right is shut, but one of the casements is broken. Below the professor's chair lies a naked male cadaver. A dissector, whose dress is distinguished by a row of buttons, is about to cut open the chest of the cadaver, using a long curved knife. Behind him stand seven persons whose heads reach to the upper edge of the chair. Three are disposed at the left side of the picture. The one in the middle is bareheaded. On the right side of the picture stand four persons, one of whom is also bareheaded. The person lowest in the picture and standing at the head of the body holds a small wand in his hand and appears to demonstrate or to guide the dissector. Below the table, over to the left side of the picture, stands a small basket. All these woodcuts are without hatching, and, in particular, the plates on pages 1a, 1b, 20a, and 26b are done in beautiful, clean, strong outlines, with lifelike expressions in the faces, the drawing and the engraving of great value. [The description of this edition, as pointed out, had been made after an incomplete copy where signature d, pages 19–25, were missing. It is therefore not certain on what page the two woodcuts, the plague victim and the dissection stood, but nevertheless their description has been accurately made after the originals which were in Choulant's copy. According to the signature this work should have fifty-two pages.] See Weigel: *Kunstkatalog*, no. 9974. Hain does not mention this edition; Copinger, II, 2433–3449; Panzer, III, 331, 1617.

Venet., 1495, fol., impr. per Joannem et Gregorium de Gregoriis fratres, die 15. Octobris.

The Latin edition of this book is of the same width as the Italian edition, but shorter by four lines. The colophon on page 40b is as follows: *Hec Anothomia fuit emendata ab eximio artium: et medicine doctore. d. magistro Petro Andrea Morsiano de Imola in aimo studio Bononie cyrurgiam legente coadiuuantibus magistro Joanne Jacobo cararia de buxeto. Et magistro antonio Frascaria Januensi cyrurgie studentibus. Impressus Venetiis*, etc. Gothic type, in two columns, with signatures but without pagination; 53 lines to the page; 40 leaves, 9 of which have woodcuts. Page 1b: The woodcut which appeared in the Italian translation on page 1a has been used again; that is to say, the picture showing the bookshelf with the lecturer's chair below and the figures in the lower part. On page 2a we see the plate which is found on page 1b, of the Italian translation, the picture of the uroscopist. Here, too, the same plate has been used. Page 2b: The circles with the urine glasses. Page 4a: The bloodletting manikin, the same plate as is

found on page 8b of the Italian translation. Page 8a, the zodiac-manikin, the plate of page 8b of the Italian translation. Page 8b, the figure of a sitting woman with her abdomen cut open; the uterus unopened and not pregnant. The vagina is cut open; the digestive organs have been removed, and only suggestions of the kidneys, ureters, and the vessels leading to the ovaries can be seen. This plate differs considerably from the illustration on page 5b in the 1491 edition, and is likely to have appeared in the Italian edition. The injuries on page 14a are taken from the same plate as appears on page 12b of the Italian translation. Page 18a has the figure on page 12a of the edition of 1491, and on page 4a of the Italian translation; the same plate has been used again. Page 21a: The person infected with the plague, as on page 20a of the Italian translation. Here also the same plate has been used. Page 26b is the same as 26b of the Italian translation, representing the opening of a dead body. It is, however, a new plate poorly engraved. The draughtsman seems to have had the original plate before him, but allowed himself many variations. The window, at the left, has no casements, and permits a view upon a landscape; in the window at the right none of the casements are broken. The lecturer in the chair has a book in front of him and raises his right hand above his left. The scrotum of the corpse is not visible. On the table upon which the body lies, one can see places where the table legs are inserted, which were not visible in the older plate. The dissector is bareheaded, his dress is not buttoned all the way up, but is open at the neck. The persons standing behind him all have their heads covered, with the exception of the head farthest to the right, which is covered in the older plate. The lowest figure standing close to the head of the cadaver has no small wand in his left hand and no right hand. The small basket is on the right side instead of the left side of the picture. The parquetry of the floor is composed of a much greater number of fields than are apparent in the original picture. The expression on the faces of the figures is by far less beautiful. The technique of the drawing is cruder and poorer. The engraving is clumsy, as can be noticed, particularly, around the eyes and the mouths of the persons.

It seems probable, then, that the original plate had become useless or had been lost before the arrangement and publication of this edition. In the copy in the Pauliner Library at Leipzig all the plates are stenciled, but show beautiful values in the fleshtones and give evidence of a manner of coloring quite different from what was then customary in Germany. [Panzer, III, 368, 1901; Hain-Copinger, 9775; Proctor, 4550.] Hain,

however, erroneously quotes *Bureto* for *Buxeto* in the concluding words. See also Weigel: *Kunstkatalog*, no. 3494. The plate representing the opening of the dead body, both in this and the following editions, was evidently done by a different draughtsman and wood engraver from the one who did the other plates with figures, although all may have belonged to the same school.

Venet., 1500, fol., impr. per Joannem et Gregorium de Gregoriis fratres, die 17. Februarii.

The size and shape of this Latin edition are the same as those of the former edition. The print is a trifle smaller and of Gothic character. The text is arranged in two columns, with signatures and catchwords, but without pagination. There are sixty-six lines to a page and thirty-two pages. Page 32a, concluding sentences: *Impressum Venetiis*, etc., followed by: *Explicit Fasciculus medicine in quo continentur: videlicet*, etc. Index and printer's device (*Druckerstock*), with the letters Z.G., standing here perhaps for Zuane Gregorio. The same plates as in the above-mentioned edition. Page 1a, bookshelf and chair; page 1b, uroscopist; page 2a, urine glasses; page 3b, bloodletting manikin; page 6b, signs of the zodiac; page 7a, woman; page 11a, injuries; page 14a, the male figure with four circles in the upper field; page 16b, the person infected with the plague. This plate, however, was shortened at the bottom so as to leave out the cat. In place of the upper part of the cat, which was left after the shortening, we see oak flooring, but the traces of the inserted wood blocks are quite evident. Page 20b: The opening of a dead body, taken from the plate of the last-mentioned edition; naturally is a poor representation. Through the shortening of the plate, the small basket has disappeared, and one can see traces of the inserted wood block in the lowest line of the oak flooring. See Hain-Copinger, 9777; Proctor, 4561.

Venet., 1500, fol., impr. per Joannem et Gregorium de Gregoriis fratres, die 28. Martio.

An absolutely new Latin edition, using the same woodcuts. Panzer, III, 469, 2584; Hain, 9776; Proctor, 4562; Weigel: *Kunstkatalog*, no. 10941.

Venet., 1513, fol., impr. per Gregorium de Gregoriis, die 10. Febr. Latin edition. Panzer, VIII, 410, 607.

Venet., 1522, fol., impr. per Caesarem Arrivabenum Venetum, die ult. mens. Martii. Latin edition.

[See also Choulant's *Handbuch der Bücherkunde für die ältere Medicin*, edition 2, Leipzig, 1841, 8°, pp. 402–5. Many statements should, however, be corrected there by what has been given in this section since at that time Choulant could not avail himself of many editions consulted later.]—Haller, I, 152.

[In addition to those already given in this section and in that on Mundinus, the following editions should be added:

Venetiis, s.a., fol., per Joannem et Gregorium de Gregoriis fratres, Hain, 9773, Panzer, III, 492, 2767.

Pampelona, 1495, G. de Brocar, Stockton-Hough; Spanish translation.

Burgos, 1495, J. de Burgos, Stockton-Hough; Spanish translation.

Venezia, 1508, per Joannem et Gregorium de Gregoriis fratres, italice, Stockton-Hough.

Mediolani, 1509, J. de Castelliono, italice, Stockton-Hough.

Antwerpiae, 1512, fol., Claus de Grave, Panzer, VI, 5, 17.

Sevilla, 1517, J. Cromberger, Stockton-Hough; Spanish translation.

Venetia, 1522, fol., C. Arrivabene, italice; Italian translation.

Venezia, 1688, Giov. Ant. Vidali, italice, Stockton-Hough.]

JOHANNES PEYLIGK

Johannes Peyligk (Peilick) [the son of the burgomaster Bartholomaeus Peyligk of Zeiz, was born in the latter city in 1474, and died September 8, 1522, in Leipzig where he had been professor of law and alderman. He wrote a philosophic work in Aristotle's scholastic style, of which only the following edition is known:

Leipzig, published by Melchior Lotter, 1499, August 12, fol.

Title: *Philosophie Naturalis / Compendium: Libris phi / sicorum: De generatione et corruptione atque / de Anima Arestotelis correspondens: non sine ac / curata Lucidissimaque Textus eiusdem elu / cubratione, ex varijs beati Thome doctoris an / gelici Egidii quoque Rhomani doctissimorum philosophie / interpretum voluminibus attente congestum;* below it four verses *Ad lectorem.* Page 1b: *Studiosis philosophie scholaribus Johannes Pey / ligk Czitzensis. Artium liberalium Magister S. D. / Cum vos condidissimos . . . . Valete foeliciter.* Page 97b: *Et tantum de membris animalibus. Et per consequens de anathomia to / tius corporis humani suarumque partium principalium. De alijs hic non / expressis diligens scholaris phisicorum interpretationem diligentius / inquirat. Impressum est opus istud in insigni oppido Liptzensi ope- / ra et solertia Melchiar Lotter Anno salutifere incarnationis Mil / lesimo quadringentesimo nonogesimo nono pridie idus septembris.* Gothic type with signature A–Q, 97 unnumbered leaves. Hain-Copinger, 12861; Panzer, I, 493, 205; Proctor, 3036 A.

The last chapter in this work is entitled: *Compendiosa capitis physici declaratio*, etc., and contains a brief anatomy of the entire human body with the divisions then customary: *Membra naturalia, spiritualia, et animata.* This chapter is accompanied by anatomic woodcuts of very crude workmanship, first on page 91b: a bust with the viscera of the three cavities, much poorer and less true to nature even than the later illustrations by Magnus Hundt (p. 125). Indeed, they are only diagrammatic representations after the Arabists. Then follow ten small woodcuts printed in between the text, representing separate organs. This last chapter had been looked upon as a separate work by Peyligk and indeed even as an anatomy of the head, but *Capitis physici* does not mean "of the head of the body" but "of the chapter on the nature (of the human body)," and contains the entire human anatomy. This chapter has, however, been printed several times separately:

Leipzig, 1516, fol., published by Wolfgang Stockel.

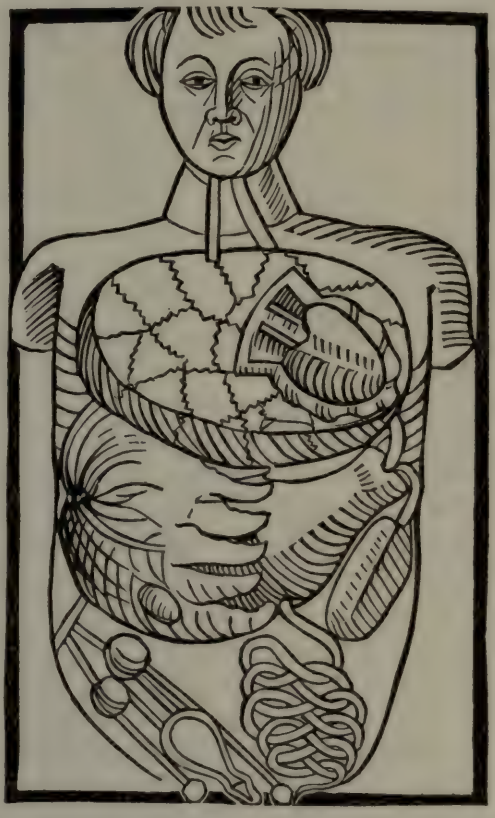
Compendiosa Capitis phisici declaratio: / principalium humani corporis membro- / rum figuras liquido ostendens: phi / losophie alumnis admodum / profutura.; below four verses: *Qui sunt humani . . . . intueare nodo.* On the back of the page: a large woodcut, representing the head and trunk with the anatomy of the three cavities, all defined by words which are either engraved on the block or were later in type; between the text following it are ten small woodcuts printed in. Page 8a: *Lips. impressit Vuolfgangus monacensis, 1516.* Gothic type with signature, without catchwords or pagination, 8 pages.—Similar earlier impressions are: *Lips.* 1510, 1515, and a later one: *Lips.* 1518. *fol.* (Haller: *Bibl. anat.* I, 154, 156).

These illustrations of 1499, which Magnus Hundt had re-engraved somewhat better for his own work and to which he added many others, had formerly been taken for the oldest anatomic representations. But Ketham (p. 115) had preceded them in Italy, and the skeleton in the larger *Hortus sanitatis* in Germany, since many of the editions of the *Hortus* must have been published before 1499. This skeleton shows more truth to nature, and Ketham more taste in the drawing, than in the illustrations by Peyligk.—Sudhoff (Karl): *Stud. z. Gesch. d. Med.*, Part VIII (1909), 113–21.]

MAGNUS HUNDT

Magnus Hundt, professor at Leipzig, was born in Magdeburg in 1449, and died in Meissen in 1519, when the university had been removed to that city on account of the plague. He published:

Antropologium de hominis dignitate, natura, et proprietatibus; . . . . Per Magnum Hundt, parthenopolitanum Ingenuarum artium Magistrum in gymnasio Liptzen.—Colophon: *Impressum et finitum est hoc Opus Liptzick per Baccalarium Wolfgangum Monacensem. Anno nostre salutis 1501*, 4°. Gothic type with the printer's mark of Wolfgang Stöcklin; 120 leaves; Panzer, VII, 138, 12.



The quires are marked with signatures from A to U. Each quire has six pages, with the exception of quires D and M, each of which has only four pages. Under U, page 6b, we find the concluding phrases, followed by another four pages marked with signature A containing the alphabetical index and list of errata. The latter concludes with these words: *Et tantum de lima Si preter ea limata studiose et humanissime lector inepta et a veritate aliena inveneris Operi etenim longo phas est obrepere somnum tu ipse sis pius absque invidia et mordacitate corrector. Deo laus.*

Complete copies of this edition are rare. A complete copy must have 120 pages; the last page is blank. The anatomic woodcuts are very crude, merely schematic, and the drawings are not done from nature. They sometimes cover the entire page, as, for instance, on the back of the

title-page, a head which recurs on page G 6b; on page G 4b, an entire body with the names of the parts; on page I 4a, a hand with chiromantic markings; on page L 2a, the internal organs of the thorax, and the abdomen, *Figura de situ viscerum*. Other plates are inserted in the text.

Formerly these illustrations had been looked upon as the oldest of anatomic illustrations, but they are not. They are, however, the most complete representation of all the internal parts up to that time, as neither Ketham nor his predecessors had been able to produce them. They also give a clear idea of pre-Berengarian anatomy, and seem to be the aggregate of the views entertained in the fifteenth century as to the position and the shape of anatomic parts. Neither bones nor muscles are represented.

Platner, Johann Zacharias: *Progr. de Magno Hundt, tabularum anatomicarum, ut videtur, auctore.* Lips. 1734, 4°, and in his: Opusc., II, 35–42; Haller, 1, 153.

Boerner: *Noctes Guelph.* pp. 167–77.

Sudhoff, Karl: *Stud. z. Gesch. d. Med.*, Part VIII (1909), 115–21.

[MARGARITA PHILOSOPHICA

Of the great number of illustrations in the well-known encyclopedia of all sciences, the *Margarita philosophica*, edited by Gregor Reisch, (*circa* 1467–1525), prior of the Carthusian monastery in Freiburg and confessor of Emperor Maximilian I, a work frequently reprinted, often with supplements, certain diagrammatic anatomic representations, quite contrary to nature, should be mentioned, although they might not be found regularly in all editions. It was not ascertained by Choulant whether they occurred in the oldest edition of *Heidelberg*, 1496, 4°; in the intervening editions they are found as follows:

1. In *Liber* VII, a man with dissected thoracic and abdominal cavities and the viscera suggested in them; pictures of the twelve signs of the zodiac are drawn either directly on, or beside the figure, and accompanied by lettering also engraved on wood; this woodcut occurs in the editions:

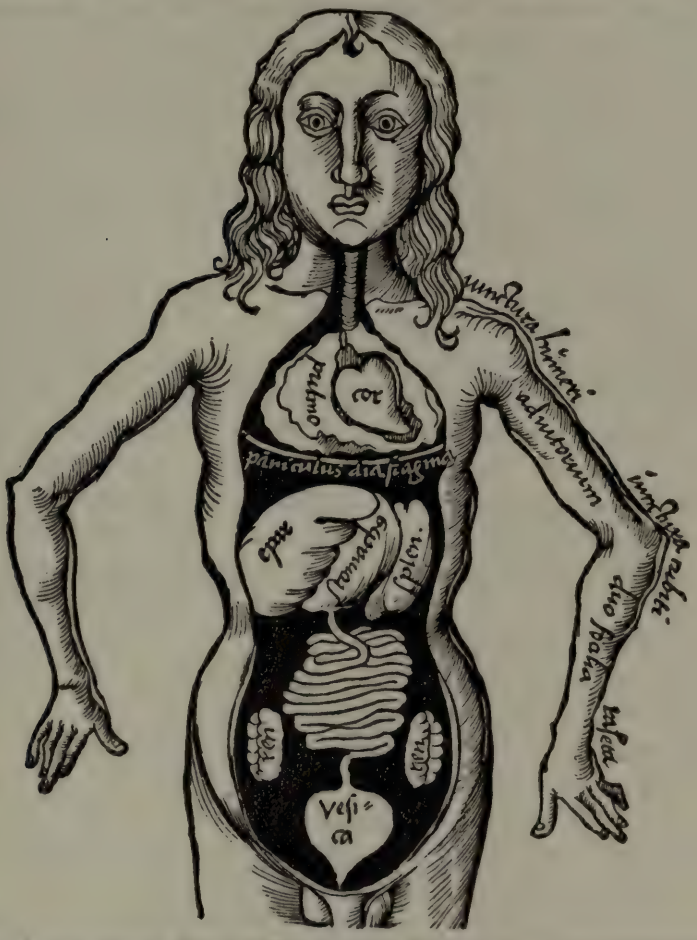
Friburgi, per Joann. Schottum Argen(tinensem), 1503, 4°, citra festum Margarethe (Juli).

S. l.; opera Joann. Schott Argentinensis, 1504, 4°, 17, kalendas Apriles (March).

Basileae, industria Michaelis Furterij et Joannis Scoti, 1508, 4°, 14, kalendas Martias (February).

Basileae, Mich. Furterius impressit, 1517, 4°, die 5, Martii. All these editions printed from the same wood blocks.

2. In *Liber* IX a man with dissected thoracic and abdominal cavities; in the dissected neck one can see the trachea, in the thoracic cavity the right lung and the heart on the left side; in the abdominal cavity, on



Visceral Anatomy from Reisch's "Margarita Philosophica," Johann Schott, 1503 (after Wieger)

a black background, liver, stomach, spleen, intestine, kidney, and bladder. The Latin names of the organs are engraved in small type either directly upon or beside them. At the top, beside the head, *Corpus phisicum* is engraved in capitals; this woodcut is found in the following editions:

Argentorati, per Joh. Grüninger, 1504, 4°, in vigilia Mathiae (February 23) (according to a statement made by the Leipzig anatomist,

Johann Christian Rosenmüller in the *Intelligenzblatt der Leipziger Literaturzeitung*, 1804, February, p. 122).

Argentorati, per Joh. Grüninger, 1512, 4°, pridie kalend. Junij (May).

Argentorati, per Joh. Grüninger, 1515, 4°, nono kalend. Februarias (January).

The plates are struck off from the same block in all these editions. In the two following editions, the plates are made from another block, cut after the preceding one. The line around the margin and the black girdle about the hips are left out, and instead the male genitals are shown. The inscription *Corpus phisicum* engraved on the above-mentioned plate is also omitted, but the names of the organs are the same and are cut on the block. These editions are the following which have already been mentioned:

Basil., industr. Mich. Furterij et Joan. Scoti 1508, 4°;

Basil., Mich. Furterius impress., 1517, 4°.

3. In *Liber* X the figures of the eye on one plate: *a*) a front view of the eye with pupil, iris, conjunctiva, and eyelids; *b*) a cross-section of the eye representing diagrammatically the cornea and the aqueous humor in their order. Both figures of the eye are given with the Latin names of the various parts engraved in wood directly upon the figures. Each figure is separately inclosed in a square; the cross-sectioned eye looks to the right. These figures occur in the editions already quoted of:

Argentorati, per Joh. Grüninger, 1504, 1512, 1515, 4°, and also in the following which have been mentioned before:

Friburgi, per Joan. Scott. Argen., 1503, 4°.

S. l., opera Joan. Schott, 1504, 4°.

Basil., industr. Mich. Furterij et Jo. Scoti, 1508, 4°.

Basil., Mich. Furterius impress. 1517, 4°.

In these four latter editions, however, the plate is struck off from another block, a reverse copy of the preceding one, without the marginal line, and with the cross-sectioned eye looking to the left.

4. In *Liber* X a profile of a head with the cranial cavity dissected and suggestions of the coronal suture, occipital suture, and the cerebral convolutions. The three "cerebral cells," i.e., ventricles, are shown connected with each other by narrower canals of which the one between the anterior and the middle cell is called *Vermis*. Written in the fore part of the anterior cell are the words *Sensus communis*, in back of that at the top, *Fantasia*, and at the bottom, *Imaginativa;* in the middle cell above, *Cogitativa*, and below, *Estimativa;* in the posterior cell one reads *Memorativa*. From the words *Sensus communis*, lines run to the root of the

nose, to the eye, to the ear, and to the tongue; on the root of the nose is written *Olfactus*, upon the tongue *Gustus*. This head was missing, perhaps only in Choulant's copy of the edition *s. l., op. Joan. Schotti*, 1504. In all the other editions mentioned, the drawing of the head is found, without exception. In the two Basel editions (1508, 1517), and perhaps also in the Freiburg edition of 1503, the plate used is a different one, is less minutely crosshatched, but copied in reverse. The head, therefore, looks to the left in all editions. A reduced copy of this head may be found in Lodovico Dolce: *Dialogo nel quale si ragiona del modo di accrescere e conservar la memoria, Venezia, 1562, 8°*, 120 pages, on page 5.

The later edition of the *Margarita philosophica* Choulant did not see.

The figures of the Strassburg editions: the visceral manikin with the black girdle (Number 2), the two figures of the eyes (Number 3), and the head (Number 4) may also be found in the edition of Hieronymus Brunschwig (Braunschweig): *Liber de arte distillandi de compositis, das Buch der wahren Kunst zu destillieren Composita und Simplicia*, published in Strassburg by Joh. Grieninger, 1512, fol., Book V, entitled *Thesaurus pauperum oder Micarium* on pp. 284, 295, 306.

The age of the edition may, to a certain extent, be concluded from *Lib. III, tract. 2, cap. 6, de conclusione*, where the date of a letter shows the year of the printing of the edition or perhaps the year immediately preceding it.

Ebert: Bibliogr. Lexik. no. 18892.
Serapeum, 1845, p. 367; 1846, p. 63.]

LAURENTIUS PHRYESEN

Laurentius Phryesen, Frisen, Frisius, a Dutch physician of Colmar, later city physician of Metz, wrote, among other books, a popular treatise on medicine which was published under the following title:

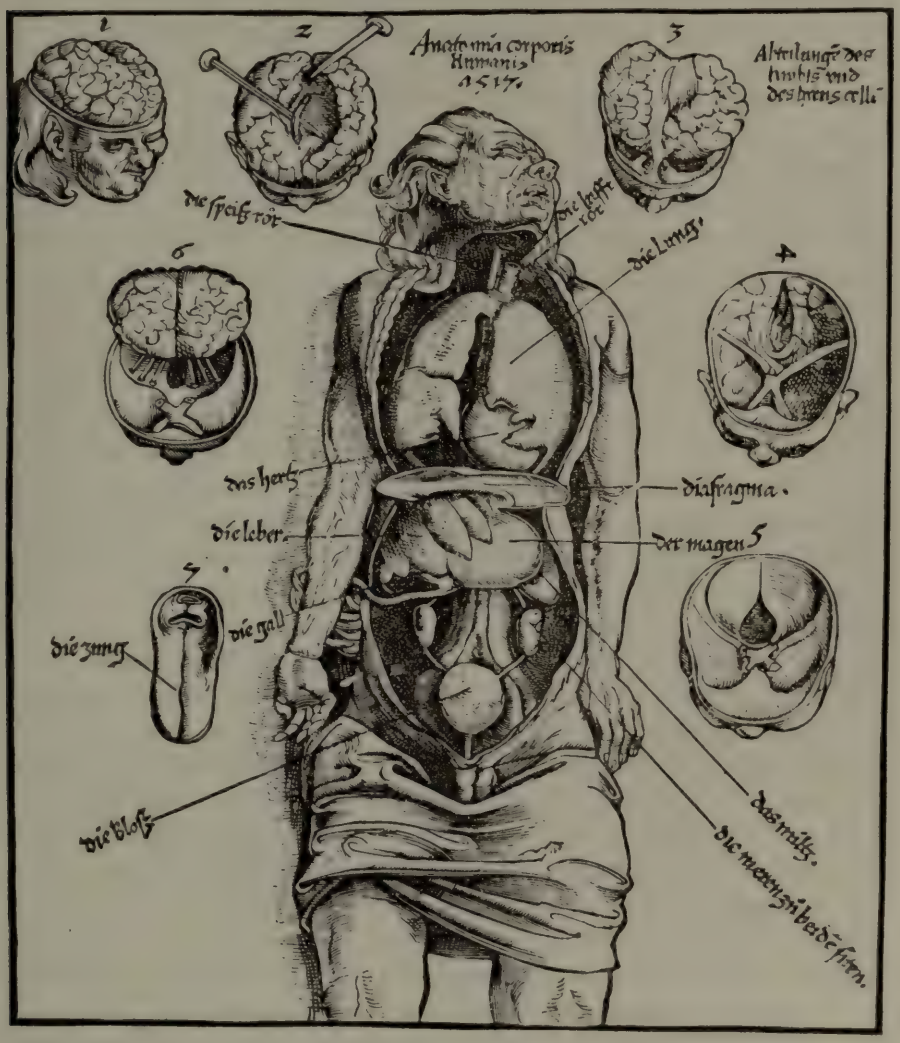
Spiegel der Artzny desgeleichen vormals nie von keinem doctor in tütsch ussgangen ist, nützlich und gut allen denen so der artzet radt begerent, auch den gestreiffelten leyen, welche sich underwinden mit artzney umbzegon. In welchem du findest bericht aller hendel der artzney, gezogen uss den fürnemsten büchern der alten, mit schönen bewerten stucken und kurtzwy(li)-gen reden, gemacht von Laurentio Phryesen von Colmar, etc. *Colophon: Getruckt und vollendet in der Keiserlichen stat Strassburg von Johannes Grieninger uff sant Gilgen tag*, etc. 1518, *fol. small, 184 leaves with signatures, 2 Col;* Panzer, I, 417, 907; also his *Zusätze* to the *Annalen der ältern deutschen Literatur*, 1802, 149.

In this work we find, besides other woodcuts which frequently appeared in Grieninger prints, two anatomic woodcuts (See Fugitive Sheets, pp. 163–64) both in small folio and dated 1517. The first plate (Sheet B) represents the body down to the knees, with the thoracic and abdominal cavities cut open, six smaller figures pertaining to the anatomy of the brain, and a picture of the tongue. The names of the parts are given mostly in German. Above the plate is the following title: *Ein contrafact Anatomy der inneren glyderen des menschen durch Wendelinum hock von Brackenau, zu Strassburg declariert und eygentlich in beywesen viler Scherer Wundartzt gründlich durchsucht.* On the plate itself is cut the words: *Anatomia corporis Humani, 1517.* The second plate (Sheet A) represents a skeleton with the names of the bones given in Latin on the margin. At the top is engraved the year, 1517; a title is not given. Wendelin Hock came from Brackenau in Württemberg and practiced medicine in Strassburg.

[The second edition of Phryesen's *Spiegel der Arznei, Straszburg, Grieninger, 1519*; small folio, is said to contain only a revised copy of this woodcut, without the verses; but in the title *Hock* is incorrectly called *Hack* (cf. Sotzmann, *loc. cit.*, p. 19; also Panzer, I, 425, 936; *Zusätze*, p. 161.]

Blumenbach attributes the woodcuts to a pupil of the elder Holbein, a certain Johann Waechtelin, who lived in Basel, and is perhaps identical

with Johann Ulrich (? Pilgrim), or the so-called master with the pilgrim's staff, who is known to be the engraver of very rare woodcuts in chiaroscuro. (Bartsch: *Peintre grav.* VII, 449.) [One is almost led to think that he had before him the plate with the verses (Blumenbach: *Intro-*



ductio in histor. medicinae litterariam, p. 114), but perhaps it was the cut described in connection with Grieninger's edition of 1529.] The plates by this man Waechtelin, or Vuechtelin, are on the whole very scarce, as he seems to have died quite young. He is known almost solely by a series of Passion figures: *Passio Jesu Christi saluatoris mundi,*

vario Carminum genere F. Benedicti Chelidonij Musophili doctissime descripta. Cum figuris artificiosissimis Joannis Vuechtelin. Fol. These same woodcuts were used in Geiler von Kaisersperg's *Postill* ("Book of Homilies"), in four parts (folio), published at Strassburg by Schott, in 1522. If any woodcuts in Phryesen's book are to be credited to Waechtelin, it could only be the woodcut on the back of page 18 in the edition of 1518, representing an instructor seated and two persons standing before him, but not the anatomic plates themselves. One is more inclined to attribute them to Hans Baldung Grien (Grün), unless we assume that Waechtelin did the engraving after that master's drawings.

The anatomy itself is pre-Berengarian, and is much superior to any anatomic illustrations then known. The manner of representation is peculiar, especially the anatomy of the brain, which has been treated in a wholly new and exceptional fashion. The drawing and the engraving are beautifully done, particularly in the non-anatomic parts. Of these illustrations of the brain, five, on newly cut wood blocks, as also the illustration of the tongue on page 70b, 86, were used in Johann Dryander's *Der gantzen Artzenei gemeiner Inhalt*, Frankfurt on the Mayn, 1542, folio.

[In 1529 two other editions, A and B, of Phryesen's *Spiegel der Arznei* appeared in Strassburg: the older one, published by Johann Grieninger, has a re-engraved viscera manikin, the later one, published by Balthassar Beck contains neither the skeleton nor the viscera manikin, but only the bloodletting manikin that still remains to be mentioned.

a) The edition by Grieninger is entitled: *Spiegel der Artzny gemachet vnd widervmb mit ernst vbersehen vnd gebessert durch den hochgelerten Laurentium phriesen*, etc., and contains the colophon *Getruckt vnd vollendet in der Keyserlichen Löblichen statt Straszburg von Johanni Grüninger auff Mittwoch nach Letare. Jn dem jar M. D. xxix.* Small folio. It contains 6 unnumbered pages and 164 numbered pages, the first one of which bears the Number IX. There are, therefore, altogether 162 pages with signatures in two columns. The viscera manikin is engraved on a plate seven inches, two lines high and five inches, two lines wide, above it in type: *Ein centrafact Anatomi der innern glider der / menschen durch den hochgelerten phisicum vnd medicine doctor wendelinum hak von bra / kenā zu Strasz. declariert in bywesen viler wundartzt grüntlich durchsucht.* Upon the plate is engraved: *Abteilung des houptz vnd des hirns cellen.* Roman numerals are used everywhere. The tongue in the upper right-hand corner of the picture is not numbered, but designated *zung*. To the right are the illustrations of the brain, II, IV, V, to the left I, III, VI. On the cadaver are engraved the words *Lung, Leber, der mag, blas;* on

the side of the cadaver, to the left in the picture and very near the shoulder, *speissrör*, to the right and close to the shoulder, but a little lower, *lufftrör*, to the left, *diafragma*, below that, *gall*, to the right, *hertz*. The intestines turned out of the body constitute a much larger mass than on the original plate; engraved beside them is *krösz*, to the right of the spleen, *miltz*, and in the renal region on both sides, *nier*, on the right side the word is slightly lower. The head is not bent back, as before, the hair is curly, the heart is vertical, the genitals are covered with a narrow piece of cloth folded crosswise, and the femurs touch each other. It is evidently another woodcut than that edited by Schott. It seems therefore that Grieninger himself had a new wood-block cut, taking the old plate as a model but making several changes. The edition has, by the way, many other non-anatomic pictures which also appear on other plates by Grieninger. Toward the end of the book we read: *Auch so wer mein meynung gewesen, dir zu beschreiben den dritten theyl der practic der artzney, so hab ich vernummen, wie disz erst neuwlich zu Straszburg geschehen ist*, etc. ("I had also in mind to describe to you the third part of the practice of medicine, but I have learned that this has only recently been done in Strassburg etc.") This omitted third part is the *Wundarznei*, and this passage, therefore, must refer to the second edition of Gerssdorff's *Feldtbuch:* Strassburg, 1528, 4°, which appeared only one year before.

b) Beck's Strassburg edition of Phryesen's *Spiegel der Arznei*, folio, was also published in 1529 with this note on the title-page: *Gebessert vndre widumb fleissig übersehen Durch Othonem Brunfels*, and the following colophon: *Cetruckt vnnd vollendet in der Keyserlichen vnnd Löblichen Statt Straszburg von Balthassar Beck, vff den. xviij. tag des Augstmonats. In dem jar vnsers seligmachers Jhesu Christi. M. D. .xxix.* The title has a broad woodcut frame with figures; page xi has the picture of the *contrafacter Lasszman* ("counterfeit bloodletting manikin"), but otherwise there is neither the skeleton, nor the visceral manikin, nor any other picture in the book; 141 numbered pages. The drawing as well as the engraving is very poor. The anatomy is pre-Berengarian. The illustrations pertaining to the brain, the tongue, as well as the skeleton, are left out.

Another edition of the *Spiegel der Arznei*, prepared jointly by Phryesen and Brunfels, was again published in Strassburg, by Balthazar Beck, 1532, 14. March, fol. The title has a very broad, woodcut frame with many figures, and within it: *Spiegel der artzney, vor zeyten zu nutz vnnd trost den Leyen gemacht, durch Laurentium Friesen, aber offt nun*

gefelschet, durch vnfliesz der Buchtrucker, yetzund durch denselbigen Laurentium, vnd M. Othonem Brunfelsz, widerumb gebessert vnnd in seynen ersten glantz gestellet. Hiemit sollen widerrufft, vnd falsch declariert sein alle exemplar disz Buchs, so vor disem truck vszgangen seind. MDXXXII. This edition has no picture except the title and contains 6 unnumbered and 142 numbered pages.

The anatomy of the visceral manikin is pre-Berengarian, but much better than in any of the anatomic illustrations that had become known up to that time. The presentation is original, and in particular, the anatomy of the brain, in the smaller figure that surrounds the cadaver, is new and unique. Five of these figures, re-engraved, however, appear in Johann Dryander: *Der gantzen Artzenei gemeiner Inhalt, Frankf. am Meyn, b. Chr. Egenolff, 1542, fol.*, as also the illustration of the tongue, on pages 70b and 86.]

The representation of the skeleton in Phryesen's book reappeared in Hans von Gersdorff's, surnamed Schilhans' *Feldtbuch der Wundartzney*, Strassburg, 1535, fol.; 1540, fol.

This picture, however, is merely a copy and does not bear the date of the year, 1517. The title of the page is printed above and reads: *Ein Contrafacter Todter mit seinen bainen fugen und glidern und gewerben auss bewehl loblicher gedechtnus hertzog Albrechts Bischoff zu Strassburg durch maister Niclaus Byldhauwer zu Zaberen warlich in stayn abgehawen un nach anzaig rechter gewysser Anatomey mit sein latinischen namen verificiert.* Below are twenty-four lines of poetry:

Der Todt bin ich grausam vngestalt
Vnd doch des lebens auffenthalt.
Wannich flaisch / adern leblich trag /
Behalt all glyder vest on klag, etc.

In the edition of Schilhans' *Feldtbuch*, Strassburg, published by Johann Schott, in 1528, 4°, this skeleton is missing. Hans von Gersdorff was a citizen and surgeon of Strassburg.

A very poorly drawn and crudely engraved skeleton, with the trunk partly covered with skin, is also found in a few editions of the *Ortus Sanitatis* by Johannes Caub or Kaub (Joannes de Cuba), whose publications go back as far as the last decade of the fifteenth century. We find it in the Latin edition, *Ortus sanitatis*, S.l. 1517, folio, on the back of page seven of quire J, and also in the German edition, *Getruckt zu Straszburg von Johannes Grienyngern vnd vollendet vff sant Gertrudten tag im iar 1529, on page Aij.* It is also found in an old Latin edition, without

place and year, 55 lines, on the back of page Kj. It can always be found at the beginning of the *Tractatus de animalibus;* that is, on the back of page one, where the explanations are printed around it. It is sufficiently known that the *Hortus sanitatis*, i.e., "The Garden of Health," is not an anatomic work, but was written for medical men and students of natural history. (Haeser cites two other editions: Marpurgi, 1537, 4°; Frankfort, 1557, fol.)

Blumenbach: *Introductio in histor. medic. litterariam*, p. 114.
Baldinger: *Neues Magazin*, III, 135–40.

JACOPO BERENGARIO DA CARPI

Giacomo Berengario da Carpi, Jacobus Berengarius Carpensis, also called Carpus, was born in the little town of Carpi in Modena. The son of a surgeon, he received instruction in anatomy from his early years and became well versed in the subject, having been, by the way, a pupil of Aldus Manutius. He praises the latter's course in academic subjects, which he attended together with Albertus Pius, the magnate of Carpi. He took his doctor's degree in Bologna, taught surgery in Pavia and, from 1502 to 1527, in Bologna. Later he went to Ferrara and lived for some time in Rome, where he earned much money treating syphilitic patients. At his death in Ferrara in 1530, he was thus able to bequeath a considerable fortune to the duke.

He seems to have read a great deal, especially in Celsus, and was famous as a surgeon and as a physician. He is credited with the earliest use of mercury in the treatment of syphilis. Benvenuto Cellini says that Berengario da Carpi spent six months in Rome, and that his treatments consisted of salves and fumigations; but after his departure all his patients became worse, and the people threatened to kill him if he returned. He also says that the Pope sought to engage Berengario, but that Berengario refused to enter anyone's service. Cellini also attributes to Berengario great learning and a good knowledge of the art of drawing:

Capitò a Roma un grandissima Ceruscio, il quale sido mandava Maestro Jacoma da Carpi. . . . . aveva questo valente uomo molta intelligenza del disegno. . . . era molto litterato: maravigliosamente par lava della medicina, etc. (Benvenuto Cellini vita, I, cap. v, II, cap. vii, edit. Lips. 1833. 12°, I, p. 45; II, p. 72.)

"There arrived in Rome a surgeon of the highest renown, who was called Maestro Giacomo da Carpi. . . . . He was a great connoisseur in the arts of design. . . . . A man of much learning, who used to discourse wonderfully about medicine." (*The Life of Benvenuto Cellini*, translated by John Addington Symonds.)

His passion for the graphic arts is also demonstrated by the fact that he was once the possessor of Raphael's painting of John the Baptist (now in the Tribune in Florence), which he acquired in return for services given to Cardinal Colonna. (See Passavant: *Rafael* I, 303.)

Berengario devoted most of his time to anatomy, to which he seems to have had a special leaning, and he prides himself on having dissected several hundred bodies. He has been reproached with having dissected

living bodies, but without justification. What he calls *Anatomia vivorum* is nothing but the so-called *Anatome fortuita*, i.e., at operations and from injuries the surgeon gets to see the internal organs and their adnexa.

(Tempore enim nostro non fit anatomia in vivis, nisi forte a medicis, ut mihi contingit interdum in incidendo apostemata etc., ubi cognoscunt colligantias membrorum, positiones et operationes et omnia requisita in anatomia. Carpi *commentaria*, fol. 4b.)

"For in our time anatomy is not practiced on the living, unless, perhaps, by physicians as sometimes falls to my lot in cutting an abscess, etc., when they acquaint themselves with the anatomic relations of the organs, positions and operations and all the things that are requisite in anatomy."

Mundinus was his paragon in all matters of anatomy. After writing a very elaborate commentary on the latter's textbook, in 1521, he decided, in 1522, to write a similar compendium of his own. This decision gave rise to his two anatomic works:

Commentaria cum amplissimis additionibus super anatomiam Mundini una cum textu ejusdem in pristinum et verum nitorem redacto,

and

Isagogae breves perlucidae ac uberrimae in anatomiam humani corporis . . . . ad suorum scholasticorum preces in lucem datae.

In a twofold relation Berengario became the founder of a new epoch in anatomy. Mundinus' work was a rather poor compendium, depending in part on the imperfect anatomy of the Arabians which he attempted to improve upon through only a few dissections of his own. Furthermore, it had already become obsolete, and many of its shortcomings had long ago been recognized. Berengario was an indefatigable observer and was, therefore, able to correct a great number of errors. He was the pioneer of independent research in the anatomy of separate parts of the body.

Mundinus never used any illustrations. The illustrations published later in his books had not been taken from nature, but from books and descriptions, and were generally nothing more than representations of traditional errors, at least as far as anatomy for physicians was concerned. Berengario was the author of the first illustrations made from nature. His innate feeling for the graphic arts seems to have aided him considerably in his first attempts.

The *Commentaria* contain (besides Mundinus' work, which Berengario copied by chapters) a veritable treasure of rare information and anatomic experiences. The latter frequently contradict the traditional views and are clearly proved in the text.

The only and very rare edition is:

Bononiae 1521, 4°, per Hieronymum de Benedictis, pridie Nonas Martii, 528 leaves with Roman pagination.

The title is a woodcut. At the top the coat-of-arms of the house of Medici (the book was dedicated to the Cardinal Giulio de' Medici), between two columns the title *Carpi commentaria*, etc., printed in red; at the lower shafts of the columns the printer's cipher *Hye. Be.* in small shields. The printer of the book may also have been the engraver. At the bottom of the plate is represented the opening of a cadaver. There are present, the lecturer sitting at the left, the bare-headed dissector, who seems to be removing the skin with a large knife, and three other persons who are covered. One of them is dressed in a long coat. Two coats-of-arms are at the base of the columns. The first six plates represent the abdominal muscles, praiseworthy for their anatomical fidelity. The drawing, however, is stiff, and the layers of muscle fibers are only crudely hinted at by means of engraved lines. Plates 7 and 8 represent the veins of the upper extremities; plate 9, the veins of the lower extremities, that is, only the veins that are usually opened in venesection; the drawing and the engraving are poorly done. Plate 10 represents the figure of a sitting woman; behind her a bed curtain. Her abdominal cavity is cut open and shows the spermatic (utero-ovarian) vessels, the ovaries, the uterus, and the bladder with the ureters. The whole is more schematic than true to nature. Plate 11 likewise represents the figure of a woman sitting and holding a veil behind and over herself with her left hand. In the abdominal cavity we see the internal genitals in a schematic representation. Plate 12 shows a woman standing and holding a veil behind and over herself; her abdominal cavity and pregnant uterus are cut open. On a pedestal beside her the picture of the uterus with the cotyledon is repeated on a larger scale. These three plates reveal a freer and more finished drawing. Plate 13, the spinal column, represented schematically. Plates 14 to 18 appear to have been intended chiefly for the graphic arts. They represent an emaciated man; a man with a rope in his hand; showing the superficial muscular layer of the front of the whole body; a man crucified; showing the superficial muscular layer of the whole frontal surface of the body; the same muscular layer seen sidewise in a man pressing a board against his knees; finally the superficial muscular layer of the back of a man holding an ax in his left hand. All five plates are based on free and artistic drawing. Plates 19 and 20 represent skeletons. One skeleton holds a skull in either hand. The drawing as well as the engraving are

poor. Plate 21, the bones of the hand and foot. This plate shows a better and more correct drawing; the foot is especially commendable. It is surprising that no illustrations of any internal organs are given, with the exception of the above-mentioned pictures of the uterus. One is inclined to attribute the exclusive attention given to bones and muscles to the fact that the author was a surgeon and a lover of art. The mention of another edition[1] of the *Commentary*, *Bonon. 1552*, 4°, or folio, seems to be based on an error, just as the mention of an English translation[2] of the *Commentary*, London, 1664, 12°, is evidently due to a mistake.

The *Isagogae* is an anatomic compendium intended to take the place of Mundinus' *Compendium*, and is superior to the latter. It was dedicated to Albertus Pius, *Comes Carporum*, and was first published in the following edition:

Bononiae, 1522, 4°, impr. per Benedictum Hectoris, die 30. Decembr., 72 leaves, with German pagination. (Panzer, VI, 333, 118.)

The title has only a border with flowers inclosed. The woodcuts are reproductions from the plates of the former edition. Plate 14, the emaciated man; plate 16, the crucified man; and plate 17, the muscle-manikin with the board on his knee, are missing. In plate 13, the spinal column, has been altered, and is a less schematic and more natural representation. On page 25a, a new plate has been added representing two uteri, one of them with the attached tubes and ovaries. The names of the parts are printed upon them. This illustration is hardly true to nature, but becomes significant in so far as the older view that the uterus ended in horns and cells has here been contested, and the cavity of the uterus has been represented without them. There has also been added the side view of a muscle manikin (*Muskelmann*, i.e., a full-length figure exhibiting its dissected muscles), with a long staff, upon which the figure leans with both hands. The drawing has been done boldly and freely, and has been but sparingly crosshatched. [In the copy from the Leipzig Pauliner Library which Choulant consulted, the three female figures were missing; but it seemed to him that they belonged to the edition, because, just at the place where they were supposed to be, two pages were also missing in his copy (pages 23 and 24, quire C), which would go to show that they had been removed from the copy. There is too little of the text missing to account for the pages which are lacking.

[1] Haeser refers to this edition.

[2] Both Haller and Haeser quote this edition under the title: Μικροκοσμογραφία; *or, A description of the Body of man; being a practical Anatomy*, London, 1664, 8°. Choulant's reasoning that this was based on an error is quite right, as the work contains illustrations from Vesalius with the text from Bauhin, Casserius, Paaw, and Laurentius.

The *Isagoge* edition of *Bononiae*, 1523 (15 July), contains the 3 schematic uteri on page 24, recto. The printer was Benedict Hectoris. (A copy is in the possession of Professor George Sumner Huntington, Coll. of P. & S. N.Y.)

Professor W. Vrolik of Amsterdam had in his possession a Strassburg edition of Berengario's *Isagogae breves* under the title: *Isagogae breves et exactissimae in anatomiam humani corporis per illustrem medicum Carpum, in inclyto Bononiensi gymnasio chirurgiae professorem;* in its dedication we read, *Joanni Locero medic. professori expertissimo. Argentorati, quarto nonas Junii 1530.* This edition contains the illustrations of the edition of 1522, but besides these a group of splanchnologic illustrations, viz., four of the heart, two of the brain, and myologic representations different from those in the previous edition. These are probably the illustrations mentioned by Haller (*Bibl. anat.* I. 169). Since, however, this edition was not prepared by Berengario himself, and since such illustrations are not found in the edition of *Venice* 1535, it seems doubtful whether they are his at all. The date of the edition is also uncertain since the date of the dedication cannot be accepted as decisive.[1] It is true, though, that mention is made of an edition *Argentorati, apud Henr. Sybold*, 1530, 8°. (Linden: *Renov.* p. 478.)

The 1522 edition was followed by those of *Venet., 1523, 4°*, and *Argentorati, 1533, 8°*. (Panzer, VI, 123, 849.)

Haller saw both these editions and says that, in the first, the female figures were added for the first time, which is incorrect, after what has been said above. Perhaps he saw an incomplete copy of the edition of 1522 and did not examine it thoroughly. Haller also asserts that he found in the edition of 1523 other representations of the uterus and pictures of the brain and heart which have not even been found in the edition of 1535.

Venet., 1535, 4°, impr. per. Bernardinum de Vitalibus Venetum, 63 leaves with German pagination; the last leaf has the erroneous number 61. (Panzer, VIII, 542, 1781.)

The title-page represents at the bottom a dissection at which are present the lecturer, at the right, sitting behind a desk, with an open book before him, the dissector with his head covered, holding up a large knife, and eight other persons. One of these standing on the level ground at the head of the cadaver, points with a small staff to the place where the dissector is supposed to begin to cut. The body is still unopened. At the feet of the body we see a servant bringing something into the room.

[1] Panzer cites an edition of 1530, 8°, *sine loco*, IX, 150, 430.

He is the only person without headdress. The other six are sitting or standing on a dais. At the left of the body, on the floor, we see a large water basin. Both drawing and engraving are excellent and superior to those of the other plates. This sheet belongs to the school of Mantegna, or at least to a different school of art than the other plates, which are inferior, although also north-Italian sheets. They are, nevertheless, of equal interest. The anatomic plates are in number and content identical with those of the edition of 1522 and represent the same subjects. They are, however, all re-engraved and altered and betray a considerably inferior workmanship. Haller is probably referring to this circumstance when he points out this edition as *minus nitida.*

The reprint of the *Isagogae* attached to *Alex. Benedicti anatomice Argentor. 1528, 8°*, contains smaller and very poor woodcuts.

It has been asserted repeatedly, and as often denied, that the woodcuts in both works of Berengarios da Carpi were done by his contemporary, Hugo da Carpi, the wood engraver. In any case, this cannot be said of all the plates, and may perhaps be true only of plates 14 to 18 of the *Commentaria*, intended for artists. (Haller, I, 167.)

[Berengario's illustration of the abdominal muscles is recalled by the woodcut on page 245b in Petri Aponensis *Conciliator differentiarum*, Venet. 1504, fol. 17. January, which is 0.163 meters high and 0.130 meters wide and belongs to *Differentia cxcix* (199): *Quod bezel seu incisio super umbilico competat in hydropisi.* It represents two nude figures holding each other by their shoulders. At the abdomen the anatomy of the abdominal muscles is shown, less correctly and less

accurately drawn and engraved than in Berengario's illustration. It seems, however, that drawings of Berengario's figures were in the hands of several physicians before 1521, when they were printed, and that these drawings were added in the above-given edition of the *Conciliator*. Pietro de Abano (b. 1250, d. 1315) did not himself insert these illustrations in his work; they are not only missing in the edition *Mantuae, 1472, fol.* (Hain, 1), but there has not even been provided any space for them, nor is any reference made to them in the text, two facts which are true of all the other graphic illustrations of the work. They were also missing in the edition of *Venet. 1548, fol.* which Haller saw (*Bibl. anat.* I, 145). It was unknown to Choulant in which other editions than that of *Venice 1504* these representations occur.]

[ALBRECHT DÜRER

Albrecht Dürer was born at Nuremberg, May 21, 1471, and died there April 6, 1528. Like Leonardo da Vinci, he wrote treatises on mathematics, chemistry, hydraulics, anatomy, and other scientific subjects that one would imagine to have been beyond the range of an artist's knowledge. If not really the founder of the German School, he perfected the art which had already existed in his country. He was one of the first artists in Germany who practiced and taught the rules of perspective, which he is said to have learned from Lucas von Leyden. His scientific works were written during the latter portion of his life and he lived to see only two of his 150 books printed.

His book on human proportions was prepared for the press after his death by his lifelong friend Willibald Pirkheimer, to whom Dürer had previously dedicated it, and it appeared in October, 1528.

Hjerin sind begriffen vier bücher / von menschlicher Proportion, durch Albrechten / Dürer von Nürenberg erfunden vnd be- / schriben, zu nutz allen denen, so zu di- / ser kunst lieb tragen. / M.D.XXViij., below this title is Dürer's monogram. At the end of the book, on page 129b (sign. Ziij). *Gedruckt zu Nürenberg durch Jeronymum Formschneyder / auff verlegung Albrecht Dürers verlassen witib im jar von / Christi geburt. 1528. am letzten tag Octobris.*, followed by the Privilegium on page 130 (Ziiij) and on page 131: *Elegia Bilibaldi Pirckeymheri / in obitum Alberti Düreri*, printed in the Gothic type of the book; page 131b concludes it with a few epitaphs and these words: *Obijt autem non sine magno amicorum desy- / derio. viij. idus Aprilis. Anno. M.D.XXviij. Aetatis vero suae. lvij. / Bilibaldus Pirkeymherus / amico integerrimo. M. P.;* on page 132: *Corrigierung etlicher worte*, etc. Page 132b is blank. fol. The first and very rare edition is printed in Gothic type with indentures and comprises 132 pages with signatures and many woodcuts in the text, some of them covering the entire page, without catchwords and pagination; Ebert: no. 6442; Weigel: no. 291, 9923.

———*Hjerinn sind begriffen vier / Bücher von menschlicher Proportion, durch Albrechten / Dürer von Nürenberg (so) erfunden vnd beschri- / ben, zu nutz allen denen, so zu diser / kunst lieb tragen.* / *M.D.XXViij.*, below this the monogram and under that: *Zu Arnhem, Bey Johan Janssen, Buchführer daselbet. Anno M.CCCCCC.JJJ.* Without colophon,

on page 130 (Ziiij) the Privilegium, on page 131a:. *Elegia* etc., printed in Roman type, concluded on page 131b with: *amico integerrimo. M.P.;* page 132 is blank, the list of corrections, i.e., errata of the first edition, being omitted. fol. Is otherwise copied from the earlier edition, page by page, with signatures, but without catchwords and pagination. The woodcuts are the same and appear to have been printed from the rather worn and, in some cases even warped blocks of the original edition; only on the page with signature Qiiij b, the two upper heads are from other drawings. On the title of many copies the words: *Zu Arnhem—M.CCCCCC.JJJ.* are omitted, so that this edition might easily be confused with the original. But the difference in the impression as above described will help to distinguish them.

The work itself is divided, as its German title indicates, into four books. The first two books treat of the proper proportions of the human form and its separate members, according to a constructed scale. He first divides the body into seven parts, each having the same measurement as the head, and he next considers the same divided into eight parts, giving also a separate consideration to the proportions of children. The woman, he considers, ought to be an eighteenth part shorter than man. In his proportions of the female figure he follows, perhaps unwittingly, the celebrated standard of the Venus de' Medici.

In his third book he changes these proportions according to mathematical rule, and gives examples of ludicrously fat and thin figures, in which some one proportion is frightfully exaggerated. In the fourth book he shows the human form in movement, and treats especially of foreshortenings.

It is to this book that Hogarth alludes in his *Analysis of Beauty*, when he speaks of Dürer, Lamozzo, and others having "puzzled mankind with a heap of minute unnecessary divisions" in their instructions for drawing the human form; and Lord Bacon, in his essay "On Beauty," says:

A man cannot tell whether Apelles or Albert Dürer were the more trifler: whereof the one would make a personage by geometrical proportions, the other by taking the best parts out of divers faces to make one excellent. Such personages, I think, would please nobody but the painter that made them.

The first book Dürer saw through the press himself, as stated in the preface by Pirkheimer,

That although the pious and artistic Albrecht Dürer had written these four books, yet that he had only been able to revise and correct one of them; for before the other three could be ready, death snatched him away. Doubtless, if he had had time, he would have altered, augmented, or diminished many things; but his friends consider it better to give forth these three books without his corrections, than to suppress them.

In 1532–34 Joachim Camerarius prepared a Latin translation of the work, which was published at Nuremberg with the title:

Alberti Dureri clarissimi picto- / ris et Geometrae de Symmetria / partium in rectis formis / humanorum corporum, / Libri in latinum / conuersi; below this four Latin distichs and Dürer's monogram. At the end of the book: *Norimbergae excudebatur opus aestate Anni A Christo. / seruatore genito M.D.xxxij. In aedib. / viduae Durerianae.*, one blank page. fol. First part, comprises books 1 and 2.—*Clariss. Pictoris et Geometrae / Alberti Dureri, de varietate fi- / gurarum et flexuris partium ac / gestib. imaginum, libri duo, qui / priorib. de symmetria quon- / dam editis, nunc primum / in latinum conuersi / accesserunt. / Anno M.D.XXXiiij.* At the end: *Finitum opus Anno a salutifero partu. 1534. 9. Cal. Decem. / Impensis viduae Durerianae, per Hieronymum / Formschneyder Norinbergae;* then one blank page. fol. Second part, comprising books 3 and 4, is concluded by *Elegia Biblibaldi*, etc., several Latin, and one Greek poem, and *M. Beatis . . . . integerrimo. M.P.*, one page of errata and the colophon given above. These two volumes contain the complete translation of the original German edition, by Joachim Camerarius senior (b. 1500–d. 1574), the woodcuts are prints from the original blocks. Gothic type, with signatures, but without catchwords and pagination. (Ebert: no. 6443; Weigel: no. 292, 1861, 17780.) This work embodies the first application of anthropometry to aesthetics, and is technically interesting because it contains the first attempts to represent shades and shadows in wood engraving by means of crosshatching.

The short biographical sketch that Camerarius has given us in his preface to this edition is now perhaps of greater interest than all the rest of the book, but the number of editions and translations of this work that appeared in rapid succession during the sixteenth and seventeenth centuries showed that it must have supplied a want in its day, and must have been highly esteemed, not only by the Germans, but by students of other countries as well, as is evident from the following.

——— *de symmetria*, etc., *libri quator. Paris., apud Christianum Wechel 1573.* Camerarius' translation; an earlier copy of this translation, *Paris.* 1535, *fol.*, is mentioned by Ebert: no. 6443, note, but is doubted by Heller.

——— *Les / qvatre livres / d'Albert Dvrer, / Peinctre et Geometrien Tres / excellent, De la Proportion / des parties et pourtraicts / des corps humains / Tradvicts par Loys Meigret / Lionnois, de langue Latine en Françoise. A Paris, / Chez Charles Perier / 1557. fol.*, 2 and 124 pages

with newly engraved copies of the original figures, in original size; the translation is made from Camerarius, Ebert: no. 6444.

——— *Les / quatre livres / d'Albert Dürer / Peinctre et Geometrien tres excellent, / De la proportion des parties et / pourtraicts des corps / humains. / Traduicts par Loys Meigret lion- / nois de langue Latine en Françoise. Arnhem, / Chez Jean Jeansz, 1613, fol.*, 2 and 124 pages, new title: *Arnhem, 1614, fol.;* Ebert: no. 6444, note; Weigel: no. 294, 4887.

——— *Di / Alberto Durero / pittore e geometra / chiarissimo. / Della simmetria dei corpi humani, / Libri Quattro. / Nuovamente tradotti dalla lingua Latina nella Italiana, / da M. Gio. Paolo Gallucci Salodiano. / Et accresciuti del quinto libro, nel quale si tratta, con quai modi possano / i Pittore, e Sooltori mostrare la diversità della natura de gli huomini, / e donne, e con quali le passioni, che sentono per li diuersi / accidenti, che li occorrono. Hora di nuovo stampati. Opera a i pittori, e scoltori non solo / vtilo, ma necessaria, et ad ogn' altro, che di tal materia desidera / acquistarsi perfetto giudizio. / In Venetia, MDXCI. / Presso Domenico Nicolini.* At the end on the front side of the page, the printer's mark with the colophon: *In Venetia, MDXCI. / Appresso Domenico Nicolini. fol.* This translation has also been made from Camerarius; the woodcuts are newly engraved copies of the original blocks; the added fifth book is written by Gallucci himself and is without illustrations; Ebert: no. 6445; Weigel: no. 1863.

——— *Di Alberto*, etc., *In Venetia, presso Mainetti, 1594, fol.* After the preceding edition, Ebert: no. 6445; Weigel: no. 293.

——— *Beschryvinghe van Albrecht Durer, Van de Menschelycke Proportion. Begrepen in vier onderscheyden Boecken, zeer nut ende profytelyck voor alle Liefhebbers deser Konste. In 't Latyn ende Hoodguytsch, tot Nuerenbergh ghedruct, tot koste van syne naegelaten weduwe, In 't Jaer ons Heeren 1527. Ende nu in onse Nederlantsche Sprake overgheset, tot dienste der ghener die de konste beminnen, ende de Latynsche ofte de Hoogduytsche sprake niet en verstaen. Tot Arnhem 1622, fol.* A Dutch translation, made from the Nuremberg German or Latin edition with prints from newly cut blocks, Weigel: no. 11946. There is also an English translation of 1666. In Joseph Heller: *Leben Dürers*, II, Part 3, Leipzig, 1831, 8°, a Portuguese translation, made from the Italian edition, is mentioned among a rather extensive literature of Dürer's work on proportions, pages 996–1013, with a description of the original manuscript in Dresden, on pages 998–1006.

——— *Opera Alberti Dureri, das ist, alle Bücher des—Albrechten Durers von Nürenberg, so viel deren von jhm selbst in An. 1525 vnd 1528*

kurtz vor vnd gleich nach seinem todt in Truck geben. etc. . . . . *mit sein selbst sigenen gemach ten vnd geschnittenen zugehörigen Figuren, von newem auffgelegt vnd getruckt. Zu Arnhem, Bey Johan Jansen, Buchführer daselbst. Anno M.DCJJJJ, fol.* Contains the books on the measurements by means of the compass and ruler, on the human proportions and fortifications, in German, with woodcuts; cf. Haller: *Bibl. anat.* I, 171.

JOHANN EICHMANN

Johann Eichmann, called Dryander, died as professor in Marburg in 1560. He belongs entirely to the Mundinus-Berengarian School, as he had the latter's figures redrawn and copied. In his edition of Mundinus' works (1541) are six plates of the abdominal muscles; the two figures of the sitting woman; the uterus; the veins of the arm and the foot; the bones of the hand and foot; the muscle man with the rope; the plate showing the muscular layer of the back; and the plate of the crucified man. Most of them are inferior to Berengarius, with the exception of the plate representing the veins of the arm and foot, which is better than the original. Many of the plates bear the dates of the years 1536 and 1537; occasionally also a monogram of the initials G and B intertwined, G and above it G V B, or V B, or G, with a compass before it. (See Brulliot: *Diction. des monogrammes*, II, 2834, 2839.) This makes it apparent that different wood engravers were engaged in the work. But, on the whole, one can recognize the school of Hans Brosamer. The latter used to work chiefly for the publishing house of Egenolff in Frankfort.

Dryander is generally regarded as among the first anatomists who made illustrations after their own dissections. All pictures which he did not take from Berengarius, Phryesen, or, in part perhaps, from Vesalius' earliest productions, are illustrations drawn from his own dissections. Two of his works should be mentioned in our discussion:

Anatomiae, h.e. corporis humani dissectionis pars prior, in qua singula quae ad Caput spectant recensentur membra, atque singulae partes, singulis suis ad uiuum commodissime expressis figuris, deliniantur. Omnia recens nata. Per Joh. Dryandrum, Medicum et Mathematicum. Item Anatomia Porci, ex traditione Cophonis, Infantis, ex Gabriele de Zerbis. Marpurgi, apud Eucharium Ceruicornum, 1537. m. Junio. 4°.

In this work there are twenty plates. The first sixteen plates represent twenty-one figures of the head and brain. The last four plates, those of the chest and the lungs, have been added as an appendix and as models for his succeeding book. With the exception of the second plate, which occurs twice in this work, all the plates are reintroduced in the following edition, only that all nonessential parts and the margins are mostly cut off from the wood block. In the edition of 1537 we

cannot find any illustrations after Berengarius. All the plates represent anatomic figures from his own dissections. They are crude, yet do not lack a certain fidelity to nature.

Anatomia Mundini, ad vetvstissimorum, eorundemque aliquot manu scriptorum, codicum fidem collata, iustoque suo ordini restituta. Per Joh. Dryandrum Medicum professorem Marpurgensem. Adiectae sunt, quarumcunque partium corporis, ad uiuum expressae figurae. Adsunt et scholia, etc., *Marpurgi, in officina Christiani Egenolphi;* at the end of the book: 1541.

We find altogether forty-six larger and smaller plates, some of them with several figures. To the illustrations taken from the previous work eight entirely new plates are added, of the author's own, representing the stomach, the alimentary canal, the liver, the spleen, the kidneys, the genitals, and two skeletons, and eighteen plates representing the abdominal muscles, bones, and veins of the arm and foot, muscles of the front and the back of the body, and the figure of a crucified man. These latter plates are copies of Berengarius' plates, but are slightly changed.

From this book several anatomic illustrations (prints from the same original wood blocks) were used in a later work by the same author.

Der gantzen Artzenei gemeiner Inhalt. Franckfurt am Meyn, bey Christian Egenolff, 1542, mense Martio, fol., 110 leaves (the same 1557).

Twenty-three of the leaves, some of them with several figures, are plates taken from the above-mentioned book. Two sheets are entirely new and represent (1) a figure, showing the vascular system, with heart and liver, and (2) a figure showing the cutaneous veins of the back (leaves 7 and 8). On pages 70b and 86, we, furthermore, find five smaller figures representing the brain and the tongue. These figures are the same as those of Laurentius, Phryesen, *Spiegel der Artzney*, Strasburg, 1518, fol., but are positively new engravings. A great many other figures are non-anatomic, and were probably all done by Hans Brosamer. Some of them can also be found in other works. (Haller, I, 174.)

[Panzer adds to those already given, *Bononiae*, 1523, 4°, VI, 333, 123; *Coloniae*, 1529, 8°, VI, 408, 530b; Haller cites *Francofurti*, 1547, fol., with Dryander, *der ganzen Arzney gemeiner Inhalt.*]

GIOVANNI BATTISTA CANANO

Giovanni Battista Canano, Joannes Baptista Cananus, physician in ordinary to Pope Julius III, went, after the latter's death in 1555, to Ferrara as physician in chief (*protomedicus*). He is said to have been still living in Ferrara in 1578 at the age of sixty-three, which would fix the year of his birth at 1515. He began a book on the muscles of the human extremities and had a relative, the Ferrarese physician, Antonio Mario Canano, aid him in his anatomic studies. The Ferrarese painter Girolamo da Carpi (Hieronymus Carpensis, b. 1501, d. 1556 or 1569) made the drawings for the illustrations of the book. Canano calls this artist *pictorem nostro aevo non minus diligentem quam insignem* ("a painter of our time as painstaking as he is famous"). It is probable that the famous Agostino de' Musi (Augustinus de Musis, Agostino Veneziano) engraved the drawings in copper. Neither Bartsch nor other writers on art mention these illustrations.

This work was never completed, however, although we read in the preface (*reliquos sub calchographi praelo jam positos mox edituri*) "presently going to publish the remaining [books] which are already in press." Only the first book of the work consisting of twenty leaves with twenty-seven illustrations from copper engravings was published under the title:

Musculorum humani corporis picturata dissectio per Joannem Baptistam Cananum Ferrariensem medicum, in Bartholomei Nigrisoli Ferrariensis patritii gratiam, nunc primum in lucem edita. s.l.e.a. 4°; at the end, *Libri primi finis*; 20 leaves, last page blank; Sign. A–E.

The engravings, in long quadrangles, take up the left half of the page and represent the muscles and bones of the upper arm and forearm. On some of the plates, letters are engraved for explanations. The drawing is unusually exact for those days. The engraving and cross-hatching are very clean, yet the difference between bones and muscles

has not been brought out clearly enough; also a few of the bellies of the muscles (*Muskelbäuche*) appear unnatural. The paper is thin and transparent.

As the book remained incomplete and probably never appeared in the book market, and as only a few copies of the first volume were given away by its author, the work has become very rare, and only three or four complete copies are known to exist. One of them was in the library of Count Bute and seems to have come into Haller's possession. A second one, which Haller himself saw, belonged to Conrad Gesner, who had inscribed his name in the book with the remark that he had received it from Agostino Musto of Ferrara in 1543, perhaps from the engraver Agostino de' Musi. A third is in the Royal Library in Dresden. This one has on its title-page the following words, written in characters of the sixteenth century: *Sum Andreae Aurifabrj Vratislaviens. Doctor. 1545, Venetiis.* From these indications, the book must have been printed before 1543. Judged by the illustrations, it also belongs to the pre-Vesalian period of anatomy. It is possible that the appearance of Vesalius' *Fabrica* in 1543, which represented muscles in a particularly beautiful manner and which was received with such general approval, broke off the continuation of Canano's work. On the other hand, no other anatomist but Galen is mentioned in Canano's book. It has been asserted that another edition was published, *Ferrariae, 1572, 4°* (*Merck-lin Linden. renov. p. 524*), but nothing is said about it in Haller, I, 192. [To the three copies that have so far been known of the rare work by Canano; *Musculorum corporis humani picturata dissectio* should be added a fourth copy which the Royal Library in Berlin purchased for twenty ducats from the estate of the anatomist, Karl Asmund Rudolphi. (Sotzmann: *Deutsches Kunstblatt*, 1852, p. 19.)]

Ebert, no. 3441.

Falkenstein, Karl: *Beschreibung der Königl. öffentl. Bibliothek zu Dresden*, Dresden, 1839, 8°, p. 733.

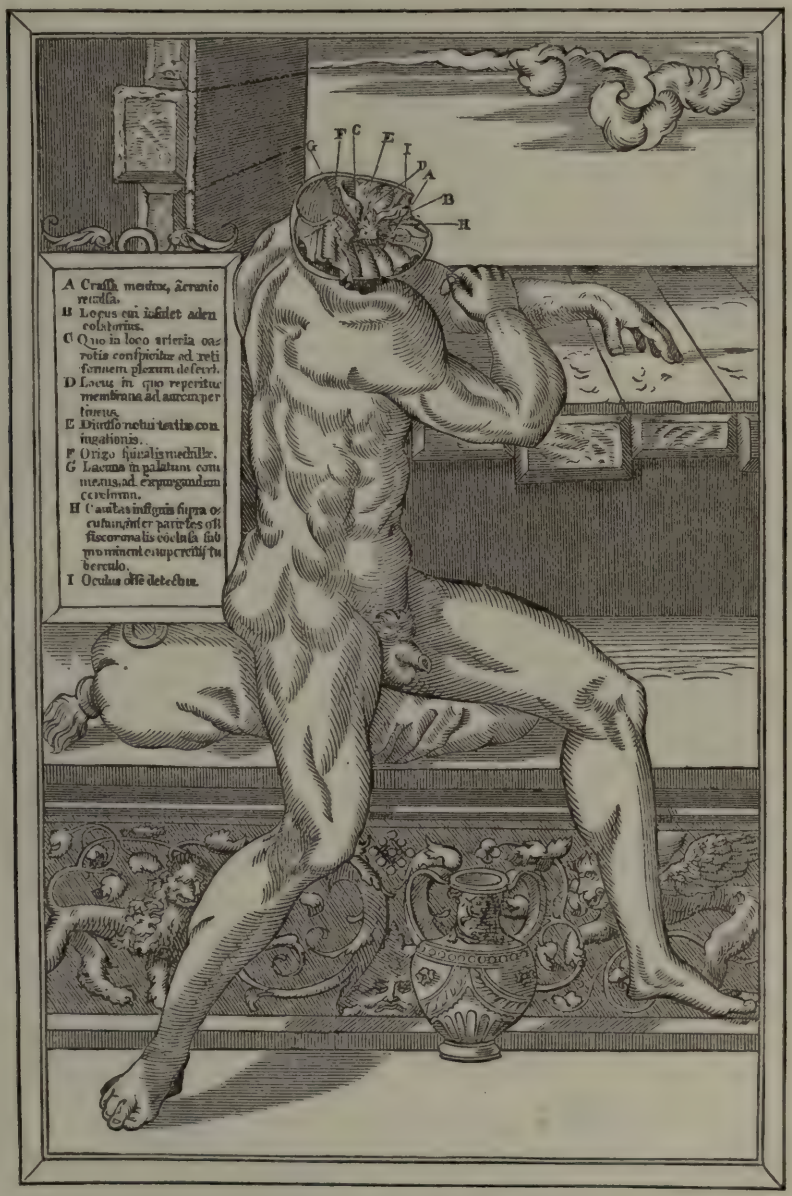
CHARLES ESTIENNE

Charles Estienne (Etienne), Carolus Stephanus, was a descendant of the famous family of printers of the same name, and was for some time foreman in his brother's printing establishment. In 1542 he received the degree of doctor of medicine in Paris and died in 1564.

De dissectione partium corporis humani libri tres, a Carolo Stephano, doctore Medico, editi. Vna cum figuris, et incisionum declarationibus, a Stephano Riuerio Chirurgo compositis. Parisiis. Apud Simonem Colinaeum. 1545, fol., 23, 375 pp.

This work was completed up to the middle of the third book as early as 1539, but the work remained unfinished *ob enatam controversiam* ("because of a dispute which has arisen"). In the French edition we read, *a cause d'ung proces qui survint.* The author complained of plagiarisms that had been published, particularly in Germany. The preparations for this work seem to have been made long before its first appearance, for several plates bear the dates 1530 (p. 154), 1531 (p. 155), 1532 (pp. 150, 151). The author speaks with praise of the assistance rendered him by the surgeon Etienne Riviere, who is named in the title, and who assisted him both in his dissection and in the drawing of the illustrations. The first plate on page 13 actually bears the monogram S.R. The other plates either have no monogram or have that of the wood engraver, François Jollat, of Paris, who was well known between 1502 and 1550. The Lorraine cross, or the cross of Jerusalem, is also used as a monogram, quite in accordance with the custom of many French wood engravers during a period of about one hundred and ten years. (Cf. Jules Renouvier: *Des types et des manieres des maîtres graveurs, Partie II*, Montpellier 1856, 4°, p. 169.) It is said that P. Woeiriot is the author of several drawings, but this is impossible if the latter was born in 1532. One should perhaps much rather suggest Jean Cousin or Maître Roux (Rosso) or Jean Goujon, that is to say, masters of the Renaissance. The work of the wood engraver is particularly excellent. The drawings, on the other hand, are neither tasteful nor anatomically correct, the best representations being, perhaps, the entire muscle-figures. The anatomy throughout is pre-Vesalian and the figures of the abdominal viscera quite arbitrary and false. The figures of the thorax, the brain, and the eye are better. The plates generally represent

the whole body with a great many nonessential elaborations, so that the rendering of the actual anatomic portion is small and indistinct. The



bodies are often artistically drawn, but are placed just as often in queer and repulsive positions. The female figures, on the whole, excel the male figures. The earlier plates of the latter are clumsier and perhaps

follow older Venetian-Paduan examples; the latter plates, beginning with page 236 and up to page 287, approach the bold style of Buonarroti.

From page 161 on, such parts of the entire figure as contain anatomic material for illustration are given on separate small woodcuts, superimposed and set in, and completely surrounded by the letters referring

to the legend, the borders of such insertions being more or less evident. This seems to show that either before or after the publication of the work, these lay figures served for other than anatomic purposes. The legend is printed on separate little plates and can therefore be removed. There are altogether sixty-two full-page plates, among them several repetitions; and besides these there are a great many engravings inserted in the text, particularly those pertaining to the study of the muscles and the eye. The text is more instructive than the illustrations, and is particularly significant from the viewpoint of the history of anatomic discoveries, since Estienne was himself a dissector, began his work long before the appearance of Vesalius' work, but did not finish it until after the latter's publication. There exists one copy of the work on parchment and with illuminated figures.

A French translation was published under the title:

La dissection des parties du corps humain diuisée en trois liures, faictz par Charles Estienne docteur en Medecine: auec les figures et declaration des incisions, composees par Estienne de la Riuiere chirurgien. Paris, chez Simon de Colines, 1546, fol., 16+406 pp.

The illustrations are the same as in the Latin edition, with the exception of the first five plates. These contain two side views of skeletons which we do not find in the Latin edition. The plate representing the back view of the skeleton with architecture is missing here, but occurs on page 352. In the Latin edition it is repeated on page 324. The French translation, therefore, has in all sixty-three wood engravings.

Haller, I, 195.

Ebert, no. 6960.

Weigel, no. 17772, with animadversions as to the different artistic tendencies of the illustrations.

FUGITIVE SHEETS (*FLIEGENDE BLÄTTER*) WITH PRE-VESALIAN ANATOMY

Fugitive sheets (*fliegende Blätter*), with pre-Vesalian anatomy, representing whole figures with the names of the parts or explanatory texts, were published either on a single broadside or on two sheets, each with printing on one side only. In this period several appeared. They were generally intended to disseminate popular information, or to give instruction to barbers and surgeons, and were probably to be hung up in their anterooms. Usually they show an already obsolete anatomy for the time in which they appeared, seldom a scientifically exact representation. They were, in the nature of things, predestined to be scattered and lost, and, on this account, are now all of them exceedingly rare.

In addition to the first six Vesalian plates mentioned in the article on Vesalius, of which there were a few reproductions, these include:

Two sheets: *Osteotome. i. ossium corporis humani divisio ex Galeno praecipue collecta. Paris., apud Christianum Wechelum*, 1536, fol.

This represents a front and back view of the erect skeleton in woodcuts, with Latin explanations printed on the margin. In the copy before me, the figures are colored brown, on a yellow background. The drawing is better, and, as regards anatomy, more exact than that in Berengarius, Dryander, and Ryff. The woodcut is beautiful and distinct, but the proportions of the skeleton are neither beautiful nor true. The skeletons themselves are not without anatomic errors and fall considerably short of Vesalian representation. These two sheets can also be found in some copies of the Greek edition of Galen *Basil.* 1538, fol. V.

Two sheets: *Nicolai de Sabio viscerum viva delineatio, Venet.*, 1539, fol.

These represent a male and a female body in which the abdominal viscera are drawn on separate, movable layers, in a fashion suggestive of their sequence from front to back in the human body. The arrangement is similar to that which Vesalius adduces and illustrates in his *Epitome.* The anatomy is older, showing the liver with many lobes. The drawing is crude. (Haller I, 179, 333.)

Two sheets: *Anatomia oder abconterfeyung eines mans leib, wie er inwendig gestalt ist, ... eines Weybs leib, wie sie inwendig gestalt ist. Gedruckt zu Nürnberg durch Hans Guldenmundt*, s. a. fol.

Representations of a man with a twig in his right hand and an apple in his left, and of a woman with a flower in her left hand, both nude and seated (evidently intended as Adam and Eve). The anterior wall of the trunk can be opened and turned upward. Beneath it is shown the anatomy of the thoracic and abdominal cavities. The pictures of the internal parts cannot be turned aside or removed separately. The anatomy is pre-Vesalian. In the female figure we see the uterus enlarged and opened; in it a cowering fetus,[1] with its hands before its eyes. In the female figure the names of the different organs are engraved on them, mostly in Latin, sometimes in German, as *Nier* (kidney), *Plostdarm* (colon), *Masdarm* (rectum). On the male figure we find instead of the entire words only letters. Above each figure and on both sides of it, we find a description in German of the several organs and separate representations on small wood engravings. These representations and descriptions are the same on both sheets, with the exception of the sexual organs. On both sheets the principal figure and the side figures are illuminated. The drawing and the engraving of the principal figure are rather good and done with crosshatching, probably by the wood engraver, Peter Flotner, of Nuremberg, who died in 1546. We must not confound these two sheets with the following:

Ausslegung vnd beschreybung der Anatomi, oder warhafften abconterfetung eines inwendigen cörpers des Manns vnd Weybes, mit erklerung seiner innerlichen gelider, etc., *1539. Gedruckt zu Nürnberg durch Hans Guldenmundt, 4°.*

Twelve sheets with crude wood engravings between the text, representing individual organs of the thoracic and abdominal cavities and conveying popular instruction in anatomy and remedies for various diseases. There are no entire figures among them. The wood blocks used are also not the same as those of the above-described plates, but blocks by Hans Weygel, which we will mention further on. This book was republished in Ulm in 1541, 4°. (Haller, I, 180.) Guldenmundt was a wood engraver and a printer in Nuremberg and is supposed to have worked between 1520 and 1546.

Two sheets with the monogram C. B. in copper, fol.

Illustrations of a man and a woman with the apple and the flower, both nude and in sitting postures. Copied from the above-mentioned woodcuts. Here, too, the picture of the front wall of the trunk can be opened up, allowing a view of exactly the same anatomy with the same

[1] The statutory position of the *fetus in utero* was first correctly given in the MS drawings of Leonardo da Vinci.

names and the same letters as in the above-mentioned figures. The representation of the uterus with the cowering fetus is also entirely the same. I am unable to see from the copy before me whether text and illustrations surround the main figure, the edges of my copy being cut close to the margin of the plate. On the copperplate itself nothing else can be seen. Both sheets are colored. On the sheet showing the male figure the monogram C. B. is engraved on the left-hand side at the bottom. On the second sheet representing the female figure this monogram is missing. It may stand perhaps for Cornelius Bos (Bus, Bosch), a copper engraver and dealer in copper engravings, who moved to Rome in 1540. These sheets were probably engraved in Germany or the Netherlands before his departure.

Two sheets: *Anothomia, oder abconterfettung eines Mans leyb, wie er innwendig gestaltet ist, ... eines Weybs leyb, wie er innwendig gestaltet ist. Getruckt zu Strassburg durch Heinrichen Vogtherren*, 1539, fol.

Representations of a man and a woman, nude, sitting figures, with some kind of garment thrown around their hips. The right hand is hidden behind the thigh, the left hand is lying on the garment, but, like the right hand, holds nothing. The apple and the flower are left out. The picture of the front wall of the trunk can be folded upward. Beneath it the anatomy of the internal organs is not merely drawn, but the different pictures of the various organs can also be lifted up separately. The names of the organs are printed on the parts either in Latin or German. The uterus shows the crouching fetus with its hands placed on the sides of its head without covering the eyes. The drawing is by far cruder, and the anatomy is even more obsolete, than on Guldenmundt's sheets. Moreover, we find, just as on the latter's sheets, printed text with illustrations of the different organs above and on both sides of the principal figure. These, indeed, are the same illustrations as on the Guldenmundt sheets, but a different wood engraving. Two wood engravers and art dealers in Strassburg had the name Heinrich Vogther. The older one was a painter, copper etcher, and wood engraver, and is supposed to have been born in Augsburg, in 1490. The younger one is said to have been born in 1513. These sheets are probably by the older man. [A description of Vogther's plates, in which eight smaller anatomic woodcuts are printed, is contained in: *Avszlegung vnnd beschreibubg der Anathomi, oder warhafften abconterfetung eynes inwendigen cörpers des manns vnnd weibes, mitt erklerung seiner innerlichen, gelider* etc. *Getruckt zu Straszburg durch Heinrichen Vogtherren. Anno M.D. XXXiX. 4°*, 18 pages Gothic type with signatures and catchword.]

There is supposed to have been a second edition of the above-described *Anothomia*, Strassburg, 1544, fol., which Haller saw: *Abconterfeytung eines Manns leib, wie er inwendig zu sehen ist, ... eines Weibs Leib*, etc. This edition was also published as two illuminated sheets. (Haller, I, 180.)

[Two sheets: *Anatomia interiorum partium humani corporis ac earundem situs, figura, numerus, positio, haud iniucunda cognitu.— Anatomiae perutilis interiorum muliebris partium cognitio ac earundem . . . . cognitio. Argentorati, apud Jacobum Jacundum*, 1551, 1552, fol.

Representation of a man and a woman with the Latin text on the back with smaller illustrations of single organs within. The principal figures are identical with those published in 1539 by Vogther in Strassburg. The plate with the male figure bears the date 1551, the female figure the later date. Both plates are illuminated.]

Two sheets: *Anathomia oder abconterfectung eines Mans leib, wie er inwendig gestaltet ist, ... eines Weibs leib, wie er inwendig gestaltet ist. Gedruckt zu Nürnberg, durch Hans Weygel, Formschneyder*, 1556, fol.

They are exact copies of the figures by Vogther, but different and, indeed, inferior woodcuts. The internal anatomy is also demonstrated in exactly the same way. The smaller woodcuts between the text that surrounds the main figure are the same drawings but re-engraved. Several of the wood blocks had been used before for Guldenmundt's book: *Ausslegung und beschreybung der Anatomi, Nürnberg*, 1539, 4°. Both sheets are illuminated. Hans Weygel of Amberg was a wood engraver and art dealer in Nuremberg and died there in 1590.

Two sheets: *Anathomia, oder Abcontrafectung eines Mans Leib, wie er inwendig gestaltet ist, ... eines Weibs Leib, wie er inwendig gestaltet ist. Gedruckt zu Nürnberg, durch Matthes Rauch Brieffmaler*, 1584, fol.

The woodcuts are taken from the same plate which Weygel had been using. The arrangement of the sheet is exactly the same. The smaller woodcuts in the surrounding text are also taken from the same blocks. The only sheet before me, the sheet of the female figure, is illuminated.

Two sheets: *Anathomia oder Abcontrafectung eines Mans Leib, wie er inwendig gestaltet ist, ... eines Weibs Leib, wie er inwendig gestaltet ist. Gedruck zu Franckfort am Mayn, bey Conrad Corthoys.* s. a. fol.

The drawing is the same as that of the above-mentioned sheets, i.e., it repeats Vogther's figure. The woodcut of the main figure is new and so are the smaller woodcuts in the text. All around the sheet runs a decorated border; within it is the German explanation with the smaller

woodcuts, on both sides of and above the main figure. The sheet before me, the sheet of the male figure, is illuminated.

[Two sheets: *Anathomia, oder Abcontrafectung eines Manns Leib, wie er inwendig gestaltet ist . . . . eines Weibs Leib, wie*, etc. *Gedrukt zu Nürnberg, bey Georg Lang, Formschneider*, etc., 1588, fol.

These represent also Vogther's figures, with German text. The plate used, however, is another one by Hans Weygel. The sheet Choulant describes had a male figure and was illuminated. Georg Lang, *Formschneider* or wood-block cutter and illuminator in Nuremberg, is believed to have died in 1620. A comparison of the fugitive leaves mentioned on p. 155 and elsewhere in this chapter with the first six Vesalian plates will show, by the way, that there are no copies from those six plates on any of these sheets. The fugitive leaves are all representations of an obsolete pre-Vesalian anatomy.]

Single sheet: *Anatomie tres-vtile, pour congnoistre les parties interieures de l'homme et de la femme. Composée par Maistre André Vesali, auec ample declaration des veynes principales et maniere de biene Signer* (*bien saigner*), etc. *Paris, par Jean de Gourmont*, 1585, fol.

At the top, in the center of the sheet, we see a large woodcut representing a tiled bathroom. Above, a small window through which one can see a landscape. In the room a nude man sits on a wooden bench and at his left sits a nude woman. Both have a narrow garment fastened at their hips. The woman's garment covers the right forearm. The man is holding his left hand over a water basin. The woman has in her right hand a small tablet with a handle on which are inscribed the words: *Nosce te ipsum. Know thyself.* The veins of the arms and the feet are drawn only on the male figure and are marked with letters. The part representing the anterior wall of the trunk can be turned upward and one sees then a pre-Vesalian anatomy of the internal parts of the thorax and abdomen, which again may be turned aside separately. On the foot-rest of the bench, to the left, we find a monogram R. S., and below it the dissecting knife. Above the male figure these words are printed: *Interiorum corporis humani partium viva delineatio;* above the female figure the following words: *Perutilis anatomes interiorum muliebris partium cognitio*, etc. On both sides of the plate there are anatomic explanations of the parts. Below them the whole width of the plate is taken up by directions for venesection, and the names of the veins involved. The woodcut itself is illuminated in colors. The mention of Vesalius in the title is only a pretense, for the anatomy is not Vesalian, but more obsolete than should have been expected even at that time. A

second edition of this print was published in Paris for Michel de Mathoniere, 1613, fol., using the same plate, but the picture is not colored in the copy before me. The printed text is the same and so is the title: *Anatomie tres-vtile*, etc., *de bien Seigner*, as is here corrected. The monogram is also on this plate. These prints belong to the Dutch school of art. The monogram should, therefore, not be interpreted as standing for Raffaello Sciaminossi (Schiaminossi), who, by the way, was not born till 1570 and, for this reason alone, could not have done the engraving. There exist, however, two prints done by him, viz.:

Two copperplates: *Aderlassmann von vorn und vom Rücken gesehen*, 14 inches, 10 lines high, 14 inches wide.

The first print represents the front view of the figure of a naked man, to the left of it the head of the same figure, and to the right the abdomen of a woman. The places for venesection are indicated. The second print represents the back view of a similar figure, with the monogram in the lower right-hand corner.

See Bartsch: *Peint. grav.* XVI, 211, and following pages: 128, 129; see also Nagler: *Künsterlexikon*, XVI, 156.

Single sheet: *Aderlassfigur.*

This represents a patient prepared for a venesection. The figure is sitting at the left, with its arms on a table to the right. On the arms the veins are exposed. Cupping instruments, lancets, etc., are lying beside the figure. On the floor, also to the right, stands a decorated water basin and beside the basin we discern the mark of the famous Bolognese painter and copper etcher, Bartolommeo Passarotti (b. 1530–d. 1592). At the top we read "*Incidendarum Venarum Typus.*" The height of the print is twelve inches; width, eight inches four lines, in old French measure. Bartsch did not describe this unusually rare and exceedingly clever etching in his work on this master (*Peintre graveur*, XVIII, 1). The print may have been intended for a book. Moreover, it should be added that illustrations of the bloodletting manikin (*Aderlassmann*), either as a skeleton or as a muscle-manikin, can be found in almost all editions of the French Books of Hours (*Heures*).

[*Viscerum hoc est interiorum corporis humani partium descriptio* is the main title of an oblong folio sheet a little more than nineteen inches wide, consisting of several prints pasted together. The two central prints, each about twelve inches high and five inches wide, show on one a nude man seated, and on the other a nude woman seated. Each figure, from the sternum down to the pubes, is provided with six and seven flaps, respectively, which are cut out and fastened one on top of

the other in such a way that they may be folded aside to give a view of the position and the connections of the internal organs. They are marked with letters, with the exception of the uterus and the parts relative to the female, which are designated by numbers. Two prints of the same size are pasted to the right and left of this print; one at the left contains the explanation of the letters (among the names of organs Greek and even Arabic occur) while the other one presents the explanation of the numbers under the title: *De utero et mulieribus vasis.* Below at the right may be read *Membra hominis positu, numeroque tabella figurat. Quid longis opus est, si brevis esse potes.* and seventeen lines to the reader with *Lectori S.* underneath. To the left of the figure of the man there is a shield with the words, *Antwerpiae, apud Sylvestrum Parisium, Typographum,* and between the legs of the woman a similar shield with the words *Sylvester Parisium, figurarum sculptor imprimebat Antwerpiae.* Both figures are well drawn and equally well engraved. Sylvestre de Paris was a form-cutter (*Formschneider*) and printed epistles in Antwerp during the first half of the sixteenth century. The description of this sheet was given by Privy High Councilor of the Treasury Sotzmann of Berlin.

Single sheet: *Skeleton.*

This represents a human skeleton on a folio woodcut with the words: *Anathomia ossium corporis humani.* At the right is stated that it was done after *Ricardus Hela, Nurinberge, 1.4.9.3.* This sheet is found appended to a work which formerly belonged to the well-known physician, Hartmann Schedel, and is now in the possession of the Munich Hofbibliothek (Venet. 25. Sept. 1492.). Letters of his are bound with the book and are followed by the printed book catalogue of Joh. Regiomontanus: *Hec opera fient in oppido Nuremberga Germanie ductu Joannis de Monteregio* (Ebert: no. 18768) on a printed sheet, which again is followed by a blank page preceding the plate of the skeleton by Hela; cf. H. F. Massmann: *Die Zylographa in München,* Leipzig, 1841, 8°, p. 34; *Serapeum,* 1841, p. 312.

Two Sheets: Skeleton, A; Viscera-manikin, B.

These were published by Johann Schott in Strassburg 1517. *fol.*, representing a skeleton and the viscera-manikin. (Weigel: *Kunstkatalog,* no. 18708c, 18777, 20083):

A. Front view of skeleton, head slightly turned to the right side of the body, arms hanging down, on both sides and wherever there is space, Latin names of bones have been engraved upon the plate, and in the uppermost left-hand corner of the picture the year, 1517. At the top,

above the plate, is printed in type: *Ein contrafacter Todt mit sein beinen fugen vnd glyderen / vnnd gewerben, vsz beuelh loblicher gedächtnüsz hertzog Albrechts biscoff zu Straszburg, durch meister / Nicklaus bildhawerf zu Zabereb worlich in stein abgehawen, vnd noch anzöig rechter gewisszer Anatomy / mit sein latinischen namen verificiert.* Below the plate printed in type, twenty-four verses of moral reflections upon death in two columns: *Der Todt binn ich grausam ungstalt, Vnd doch des lebens vffenthalt . . . . Eer Gott, dein acht, die welt vernicht. Dein seel ewig, der leib verblicht*, followed by Joh. Schott's printer's mark.

This is the original form of the sheet. It was designed as a fugitive anatomic sheet and not planned for any book, and could well pass for an anatomic and emblematic wall-picture. In this form, folded together obliquely in the middle, it was first inserted in the first edition of Hans von Gerssdorff: (called Schylhans) *Feldtbuch der wundartzney, Straszburg, bei Johann Schott*, 1517, small folio. In another edition of this book which appeared later in a smaller size and also published by Johann Schott, *Strassburg*, 1528, 4°, this plate is also said to occur (Blumenbach: *Beschreibung der Knochen*, preface, page 19), but it is missing in my copy and might frequently be missing on account of its being too large for the size of the edition. Many an owner of the book might have preferred not to have the plate sewed in, but to use it separately. It is said to have been omitted altogether in the edition of *Straszburg*, 1526, 4°, but to have been inserted in that of 1530.

The same woodcut, struck off from the same block and folded together obliquely in the same fashion, may be found in Laurentius Phryesen von Colmar: *Spiegel der Artzny, Strassburg, b. Johannes Grieninger*, 1518, small folio, but here it is without any printing, i.e., the title, the verses, and Schott's printer's mark are omitted. The second edition of this small folio is said to contain only an inferior, somewhat changed copy of the skeleton, also without printing (Sotzmann, *Deutsches Kunstblatt*, 1852, no. 2, p. 19). Regarding Phryesen and his works see page 130.

B. Viscera-manikin, part of a male figure, from head to below the knees, with a wide piece of cloth thrown over the thighs, thoracic and abdominal cavities dissected; also seven accessory figures, the brain, cranial cavity, and tongue, with engraved German designations on the plate. At the top, above the head, is engraved: *Anatomia corporis / humani / . 1517.* Above the plate is printed: *Ein contrafact Anatomy der inneren glyderen des menschen / durch den hochgelerten physicum vnd medicine doctorem Wendelinum hoch von Brackenaw, zu Straszburg /*

declariert. vnd eygentlich in beysein viler Scherer vnd Wundärtzt gründtlich durchsucht. Below the plate forty-six verses are printed in three columns:

Ein spyegel binn ich gschickter ärtzt . . . . Erlernest vor statt, art, natur Eins yeden glyds. als mein figur (Mit gzeügnuss sag ich dir fürwor) Hans wächtlin hat recht bey eim hor Abcontrafayt kunstlich vnd wol. . . . . Als dann klorlich anzöigt Guido, Den lisz vereteütscht im *Feldtbuch* frey, Danckbar würst sein sey wie im sey.

"I am a mirror, skilful physician . . . . you may learn of the place, the kind, and the nature of every organ. As my figure was correctly reproduced by Hans Wachtlin (I tell you truly and have evidence of it) from a harlot, artistically and well. . . . . As clearly announced by Guido. Read his German version in the *Feldtbuch*. You will be thankful whatever it may be."

Below the verses: *Gedruckt zu Strassburg / durch Joannem Schott*, and his printer's mark.

This indicates the fact that the plate was either drawn or engraved by Hans Wächtlin (Vuechtlin) of Basel, also called the master with the crossed pilgrim's staves (*maître aux bourdons croisés*) and Ulrich Pilgrim on account of his monogram, and renowned for a series of passion figures, but on the whole known only for a few plates. (Bartsch: *Peint. grav.* VII, 449; Heller: *Geschichte der Holzschneidekunst*, pp. 74, 432; Weigel: *Kunstkatalog* no. 19115; Schneegans in Naumann's *Archiv für die zeichnenden Künste*, II, no. 2, pp. 148 ff.) In the drawing and engraving this plate excels, especially with regard to the non-anatomic parts, the skeleton *A*, which was evidently done by a less skilful hand. Furthermore, one learns from the above verses that Schott was then planning the publication of Gerssdorff's *Feldtbuch der Wundarznei* and that, although primarily editing the drawing as an independent fugitive sheet, he intended to insert it later in this book, which was published by him in the same year (1517). For this book begins with a German version of the anatomy given in Guy de Chauliac's surgery, and Guy (Guido), mentioned in the forty-third verse (the third verse from the last), is the same Guy de Chauliac (*Guido de Chauliaco*) who, in the first half of the fourteenth century, was teaching in Montpellier, and who, even later, was still known among French surgeons as *Le Guidon*, his real name being perhaps just as much responsible for this pseudonym as his being such a reliable guide to the surgeons. This sheet announced itself as an independent fugitive sheet, inasmuch as the appended anatomic nomenclature and the verses written below are self-explanatory from an anatomic and emblematic point of view. It also belonged formerly as a fugitive sheet in Meuselbach's library and as such came to the Royal Library in Berlin (Sotzmann, *loc. cit.*). In the form here

described, it was inclosed (obliquely folded) in the above-mentioned edition of Gersdorff's *Feldtbuch der Wundarznei*, Strassburg, 1517, small folio. Besides being in the *Feldtbuch*, the print *B* was also contained in the previously mentioned edition by Grieninger of Phryesen's *Spiegel der Artznei*, Strassburg, 1518, small folio, struck off from the same block, but the verses, Schott's address, and his printer's mark are omitted. It seems that Grieninger borrowed the plate from Schott and although he removed the latter's address and mark, he did not put his own address in their stead. The title is the same, but slightly changed, the second line beginning with *den*, and the third reading as follows: *declariert vnd eygentlich in beywesen viler Scherer Wundartzt gründlich durchsucht.* (See Phryesen, page 130.) The word *vnd* is here either accidently omitted, or the writer had in mind the French *barbiers chirurgiens* (*chirurgi a tonstrina*).

As early as 1517, Schott had another, smaller viscera-manikin, an entire figure to below the feet, engraved for Gersdorff's *Feldtbuch der Wundarznei*. This cut shows much poorer drawing and engraving, but nevertheless, the larger plate by Wächtlin (*B*) in Hock's anatomy might have served the artist as a model for the anatomic parts. The figure itself, however, is absolutely different. This smaller plate was planned to serve both the demonstration of the anatomy and to indicate the places for bloodletting, which are designated on the plate by engraved lines and letters. In the lower left-hand corner is engraved: *Contrafacter Lasszmann, 1517*. That this plate was especially engraved for Schott's first edition of Gersdorff's *Feldtbuch* of 1517 is evident, not only from the size of the plate which exactly fits this edition, but also from the last words of treatise 1, chapter 12 of this edition of the *Feldtbuch* (page 13b):

Solich anatomy ist in der jorzal Christi. M. ccccc. xvij. in der loblichen statt Straszburg, in beysein ettlecher der gelerten vnd bewerten physicis, doctoribus, chirurgicis vnd schereren noch art ersucht vnd durchgründt, an eim erbetten todten man mit dem strang gericht. Künstlich declariert durch den erfarnen vnd hochgelerten medicine doctorem wendelinum hock von Brachenaw, vnd alsbald abcontrafact verzeyshnet mit aller gestalt, farben, vnd worer anzöige wie du es in nochgonder figuren findest.

"Such anatomy was examined in the usual manner and thoroughly investigated on the requested cadaver of a man who had been hanged in the year of our Lord, 1517, in the esteemed city of Strassburg, in the presence of a number of learned and experienced physicians, surgeons, and practitioners. It was artistically explained by the experienced and scholarly doctor of medicine, Wendelinus Hock von Brackenaw, and immediately reproduced in drawing in every shape and color, and true declaration, as you will find it in the following figures."

This figure is the illuminated bloodletting manikin, which, in accordance with its double purpose, is inserted between chapter 12, the last chapter of the anatomy and chapter 13: *von allen Adern so zu schlagen sind.* It is repeated, by the way, without illumination on page 54b. Since Wächtlin's plate *B*, and not this smaller copy, illustrated Hock's anatomy, it seems that Schott decided later to insert this larger and better plate in the *Feldtbuch.* In the edition of the *Feldtbuch* of Strassburg, 1528, 4°, we again find the bloodletting manikin, but the quoted passage is changed and evidently mentions all three plates (*A*, the skeleton, *B*, the viscera-manikin, and the bloodletting manikin). Here the last passage of the anatomy (page 16) is as follows:

Vnnd dieweil der augenschyn ein grosszer behilff ist findest du in nachgonder, vnd zwo vorgonden figuren eygentilich aller sychtlichen, jinneren vnd vsszeren glyderen, beynen, vnnd aderen gewisszliche anzöig, so zu Straszburg warlich contrafact vnnd deütlich verzeychnet ist ab eim todten, vnnd darzu erbettenen mann mit dem strang gericht. Anno Christi. M. D. XVII.

"And since seeing is a great aid, you will find in the following and the two preceding figures true pictures of almost all the visible internal and external organs, bones, and blood vessels, as faithfully reproduced in Strassburg and distinctly drawn from a dead man, who had been hanged, and had been asked for for this purpose in the year of our Lord, 1517,"

and is followed by the bloodletting manikin not illuminated. This figure then, is the following, the skeleton and the viscera-manikin, the plates *A* and *B* are the two preceding figures. It is, therefore, incorrect to assume that all three plates are by Gersdorff, and it remains doubtful whether all the pictures contained in the *Feldtbuch* were drawn by Wächtlin, as has been asserted.

Copperplate: *Skeleton.*

A copper engraving by Giovanni Battista Franco, called *il Simoleo,* seventeen inches high, twelve inches wide, representing a profile view of a human skeleton down to the knees, looking to the left, and extending half-way into the border, showing at the top a skull and on the right side, bones of the extremities. Giovanni Battista Franco was born at Udine in 1498 or 1510 and died in 1561 or 1580. There is also another plate drawn by him, in the form of a frieze, representing on one plate various skulls etched by Niccola Nelli. On the left at the bottom, we read: *B. F. V. JN. NN. ex 1563;* which means: *Baptista Franco Vdinensis invenit Niccola Nelli excudit.* (Bartsch: *Peint. grav.* XVI, pp. 141, 155.)

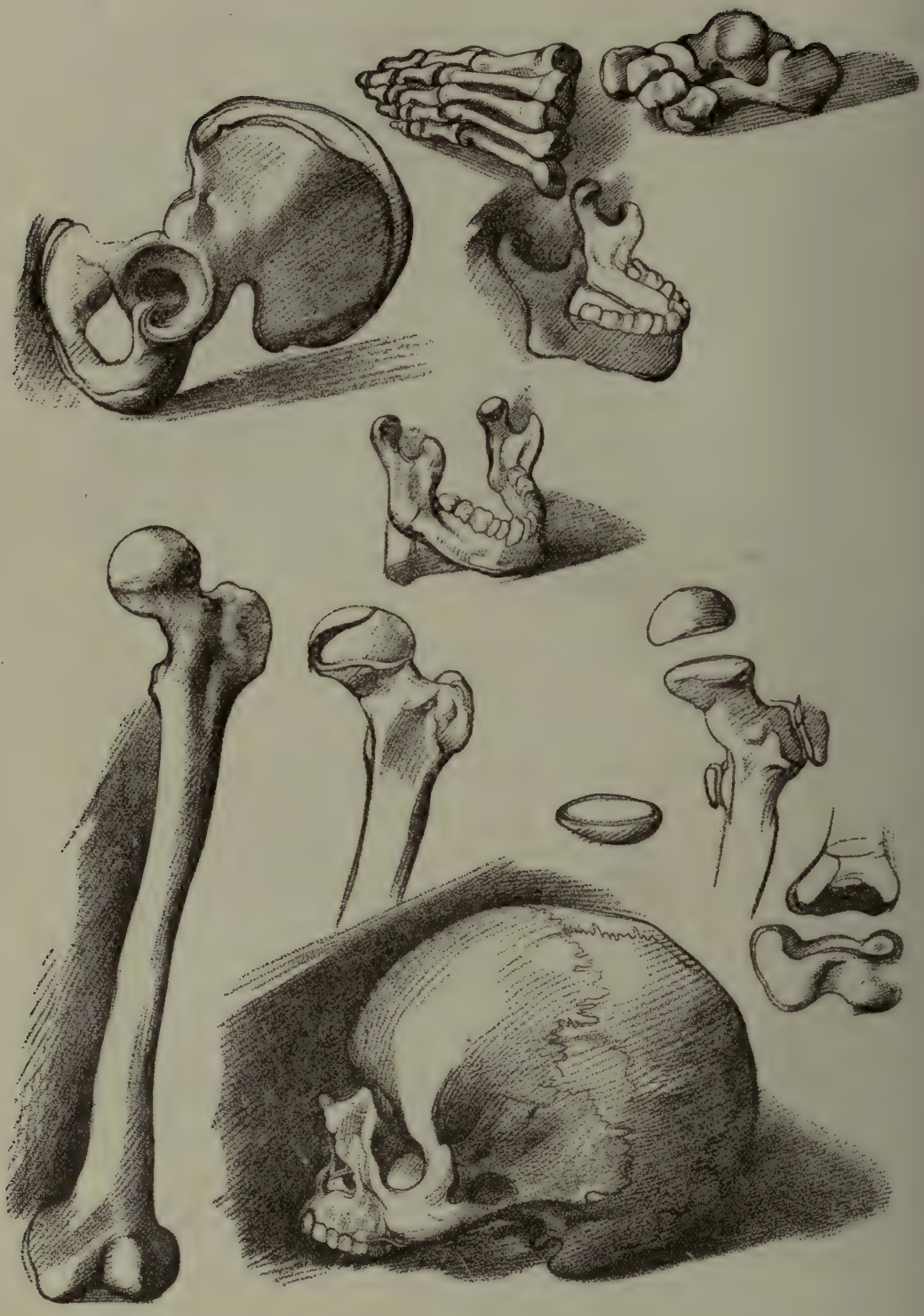
Fourteen copperplates: *Muscle-manikin.*

Fourteen copperplates in quarto, containing artistic anatomy and designed, drawn, and engraved by Giulio Bonasone, who lived at Bologna

from 1530 to 1580. Each plate represents a muscle-manikin, the last one (the 14th) representing a skeleton with its left side still covered with flesh. The representation of the muscles, on the whole, is good, that of the skeleton is poor. The positions are varying, always picturesque, and always lifelike. Some of the figures are holding in their hands a staff or a rope, others the flayed skin. The background of all the plates without exception is crosshatched with horizontal strokes, some of the plates, have a monogram containing the initials, JVB. Bartsch describes thirteen of these plates (*Peint. grav.* XV, 167, no. 329–41), the fourteenth, marked No. 14, which remained unknown to him, is described by Rudolph Weigel (*Kunstkatalog*, no. 18708, letter O.); only 1, 2, 4, 5, 9, 12, 14 had been seen by Choulant.

Eight copperplates: *Skeletons and Muscle-manikins.*

Eight (or ten) copperplates of anatomic contents (skeletons, muscle-manikins, and similar subjects) with the signature of *Ph. Galle fecit et excudit;* probably they were used later in *Instructions et fondemens de bien pourtraire pour les peintres*, etc. Antwerp, 1589, fol. by this artist and copper engraver (Weigel *Kunstkatalog*, no. 18708, letter N.). Galle was born in 1537 and died in 1612.]



Drawings in Red Chalk Made by Jan van Kalkar for the Vesalian Treatise

ANDREAS VESALIUS

Andreas Vesalius was born in Brussels in 1513, or 1514, and came from a family of physicians of Wesel in the Duchy of Cleves; the family name, originally being Wittings, was changed later to Wesele or Wessale, after the name of this city. He was educated at Louvain, studied medicine at Montpellier and Paris, and then returned to Louvain, where he began to teach anatomy. [Johann Guintherus Andernacensis and Jacob Sylvius (Johann Winther of Andernach and Jacques Dubois) are to be mentioned particularly as his teachers. Both became later his most ardent opponents.] About 1535 he was in France as army surgeon of Charles V, later going to Italy for his studies, where in 1537 he became professor of anatomy in Padua, teaching also in Bologna and Pisa. In 1543, he was called to the court of Charles V, and soon to his army at Geldern. Later he returned to Italy, visited Brussels and Basel afterward, and spent some time in Madrid at the court of Philip II as his physician in ordinary. Later, he set out on a pilgrimage to Jerusalem, but while on the island of Cyprus he received a call to Padua to occupy the chair of Fallopius. On the way he was shipwrecked and died on the Isle of Zante, October 15, 1564. [In 1847, the city of Brussels erected a bronze statue by Joseph Geefs to the memory of Vesalius.]

The chief task of his life was to revolutionize the teaching of the anatomy of the human body and to overthrow the then prevailing teachings of Galen, who had based his work only upon animal dissection. Vesalius, in this way, became the founder of modern anatomy, and, as everywhere in this field, he was active also as a reformer of pictorial anatomic representation. He supervised with the greatest care the artists who were working from his dissections and whom he had probably chosen with equal discrimination. Repeatedly he complains of the trouble they had caused him. His illustrations are executed most truthfully, with skill and taste, chiefly from dissections of strong youthful bodies, in free bold drawings, and are printed from clear and forceful wood engravings. The bones and muscles are reproduced most beautifully and with supreme power, and with greater anatomic exactitude than heretofore. The viscera, blood vessels, and nerves are less correctly interpreted, but then it is true that form was of less use here to the artist and that anatomic research was still too little developed.

As designer of the Vesalian illustrations both the famous painter Titian, Tiziano Vecelli, and Christoforo Coriolano have been named, but either possibility is, without even mentioning other conditions, highly improbable for chronological reasons. Titian was more than sixty years old at the time when Vesalius' first plates appeared, and was much sought after and renowned, while Coriolano was still living in 1600, and published his earliest work in 1568.

With more correctness, the Vesalian drawings have been ascribed to a pupil of Titian, Jan Stephan Kalkar (died 1546), whose paintings were often difficult to distinguish from those of his master. To justify this assumption we find on the Vesalian plates, published in 1538, *sumptibus Joannis Stephani Calcarensis*. Moreover, Vesalius himself says in a dedicatory letter to this edition:

Illis tabellis alias adjunximus, quibus meum σκέλετον nuper in studiosorum gratiam constructum Joannes Stephanus, insignis nostri saeculi pictor, tribus partibus appositissime expressit.

"To those pictures I have added others with which my skeleton, recently articulated for the gratification of the studious has been most appropriately illustrated in three parts by John Stephanus, a distinguished painter of our time."

Furthermore, Vesalius at the conclusion of the *Epistola docens venam axillarem*, etc. (p. 66), speaking of his future works, says:

Si corporum dabitur opportunitas et suam operam Joannes Stephanus, insignis nostrae aetatis pictor, non denegaverit, etc.

"If John Stephanus, the distinguished painter of our age, shall be given the opportunity of studying bodies along his own lines, he shall not be found wanting,"

that is to say, he names again the same artist. Further indications have not been found. Probably the artist also engraved the pictures on wood, since the treatment throughout is ingenious and highly artistic.

[High Councilor of the Treasury Sotzmann, of Berlin, lately expressed the opinion that Giuseppe Porta, alias Salviati, a native of Garfagnana in Modena might have drawn (perhaps also cut) the woodcut title in Vesalius' two principal works, representing the dissection of a female cadaver before a large assembly; cf. *Serapeum*, 1850, p. 69. Osiander, on the other hand, believes that Oporinus, himself, designed the sketch for the title and asserts that he found on the seventh myologic plate, at the bottom among the plants a "D.," being the monogram of the woodcutter, but I have not been able to find that. (Osiander: *Lehrbuch der Entbindungskunst* I, 113.)]

The dimensions of the height in the largest or principal plates by Vesalius are as follows:

1. The first six plates of 1538 by Bernard Vitalis: Sixteen inches, three lines, in the old French measure, or four hundred and thirty-six millimeters, new French measure.

2. In the books *De corporis humani fabrica* of 1543 and 1555: Twelve inches, three to nine lines, old French measure, or three hundred and twenty-nine to three hundred and forty-three millimeters.

3. In the *Epitome* of 1543, the measurements peculiar to this book are: Fifteen inches, six lines to sixteen inches, three lines, in old French measure, or four hundred and fifteen to four hundred and thirty-six millimeters.

The two large folded sheets with illustrations of the nerves, veins, and arteries as they appear in the *De corporis humani fabrica* and the *Epitome* measure sixteen inches or four hundred and thirty-one millimeters in height.

As to the figures which were published in Venice in 1538, there is no doubt that they were engraved in Italy, but it is equally certain of the illustrations which we find in the books *De corporis humani fabrica*, and the *Epitome*. These, too, were engraved in Italy, for Vesalius, in 1542, sent the woodplates for both works, through the Milanese mercantile house Danoni, from Padua to Basel to the printer Oporinus. Inclosed with this shipment was the manuscript of these works and proofsheets of all the illustrations, evidently carefully executed under the eyes of the artist. This proof was recommended to Oporinus as a model. All this becomes apparent from a letter dated *Venetiis, nono Calendas Septembres* (i.e., August, 1542), which Vesalius wrote from Padua to Oporinus in Basel, and which Oporinus printed as a preface to the two editions of the books *De corporis humani fabrica* of 1543 and 1555:

Joanni Oporino graecarum literarum apud Basilienses professori, amico charissimo suo. Accipies brevi simul cum his literis per Mediolanenses mercatores Danonos tabulas ad meos *de Humani corporis fabrica* libros, et eorundem *Epitomen* sculptas. Utinam tam integre ac tuto Basileam perferantur, atque sedulo cum sculptore et Nicolao Stopio, hic Bombergorum negociorum fidelissimo curatore, in humanioribusque studiis apprime versato iuvene, eas composui: ne aliqua ex parte atterantur, aliudve incommodum ipsis vectura inferat. Inter tabularum seriem exemplar frustatim reposuimus, simul cum impresso singularum figurarum typo, cui quo quaeque loco reponenda veniat asscripsi: ne forte illarum ordo ac dispositio tibi tuisve operis negocium facesseret, figuraeque non ordinatim imprimerentur, etc. . . . . Praecipuum studium in tabularum impressione erit impendendum, quod non vulgariter ac scholastice, velutque simplicibus duntaxat lineis sint expressae: nusquam picturae ratione (si interdum locum quo res delineatae suffulcirentur, excipias) neglecta. Et quanquam hic iudicio valeas, nihilque non de tua industria et sedulitate mihi pollicear, hoc unum percuperem, ut inter excudendum id exemplar quam

proxime imitareris, quod a sculptore speciminis sui loco impressum, una cum ligneis formis reclusum invenies. Ita enim nullus character, quantumvis etiam in umbra reconditus, oculatum sedulumque lectorem latitabit, et quod in hac pictura longe est artificiosissimum, mihique spectatu perquam iucundum, linearum in quibusdam partibus crassities simul cum eleganti umbrarum obfuscatione apparebit. Verum non, est, quod haec tibi perscribam, quum in papyri laevitate soliditateque, ac in primis in vestrarum operarum diligentia positum sit, ut singula, quale nunc mittimus exemplar, nosque hic aliquot impressimus, ex tua Officina omnibus proponantur, multisque fiant communia. Dabo operam, ut non multo post ad vos proficiscar et si non toto impressionis tempore, saltem aliquandiu Basileae commorer, mecumque formulam decreti Senatus Veneti allaturus, quo cavetur, ne quis tabularum aliquam absque meo consensu imprimat, etc.

"To John Oporinus, Professor of Greek literature at Basel, his very dear friend. You will receive in a short time together with this letter, through the merchants Danoni of Milan, the engraving (See Latin and also p. 269.) to go with my books *On the Structure of the Human Body* and the *Epitome* of these. I only wish they may reach Basel undamaged and in a condition of security commensurate in some degree to the pains I have been at in preparing them, a task in which I have been ably seconded by the engraver and by Nicholas Stopius, the trusted business agent of the Bomburgers in this town and a young man of no mean accomplishments along scholarly lines. I hope they will not be bruised in any way and that the journey may not cause them any sort or kind of damage. In among the series of engravings I have distributed the text by pages, together with proofs of each of the figures, adding directions to show where each belongs in the finished work, as a safeguard to prevent the order and distribution of these from causing any trouble to you or your workmen and the figures from being printed out of the proper order, etc. . . . . Particular pains must be used in printing the engravings, since these are not made in the common and ordinary manner and as it were in outline only; neglect nowhere the matter of the picture (even if you do occasionally omit the text on which the illustrations are based). And although in this respect you are a most capable judge, and I have the most complete confidence in your industry and pains, I should particularly desire this one thing, that in printing, you would follow as nearly as possible the printed copy sent by the engraver in place of his own draft and enclosed with the wood blocks. For this will insure that no character, however much in the background, will escape the keen-sighted and attentive reader, and that that feature which is most artistic about these pictures and to my eye exceedingly attractive, I mean the thickness of the lines, together with the nice shading, will be clearly apparent. But there is no need for me to write you at length about these matters, since it depends upon the smoothness and firmness of the paper, and particularly upon the carefulness of your workmen, that after the pattern of this copy which we now send you and which we have several times printed here, each detail should be issued by your shop to the general public and become common property. I will do my best to make the trip to your city before very long and to remain at Basel, if not during the whole time that the work is in press, for some time at least. I will bring with me the text of the decree of the Senate of Venice forbidding anyone to print any one of these plates without my consent, etc."

This is the text as it appears in the edition of 1543, parts of which appear changed in the reprint of 1555 in which Stopius, who assisted the artist in folding and the packing of the plates, is not mentioned any more as the manager of a mercantile house, but is rather praised for his humanistic learning. It is certainly not a new letter, for it still bears the same date and, moreover, the *Epitome* was not printed again in 1555.

The works of Vesalius belonging to this group are the following:

Six plates large fol. *Imprimebat B(ernardinus). Vitalis, Venetus, sumptibus Joannis Stephani Calcarensis. Prostant vero in officina D. Bernardi*, A. 1538.

These are of the utmost scarcity, since as fugitive sheets (*fliegende Blätter*) they were bound to get lost very soon. But that they were actually published becomes apparent from the fact that Vesalius, in a letter to Oporinus, prefixed to one of the books *De corporis humani fabrica* (Basil. 1543), already complains of plagiarisms[1] committed in Augsburg, Cologne, Paris, Strassburg, Marburg, and Frankfort. Even as late as 1790, the physician, Antonio Fantuzzi, bequeathed a beautiful specimen to St. Mark's Library in Venice. These plates, the third of which bears the above-mentioned address, were dedicated to the imperial court physician, Narcisso Partenopeo Vertuneo, on the first of April, 1538; see also Morelli in his book, to be reviewed later, pp. 232 ff., and also Fiorillo, *Geschichte der zeichnenden Künste von ihrer Wiederauflebung*, etc., II, 82. That there really existed six plates becomes evident from the letter mentioned; that the three skeletons in the book *De corporis humani fabrica* are identical with three of the six plates, appears to be proved by the passage quoted from the dedicatory letter (*tribus partibus*). To judge from reprints to be mentioned later, these plates

[1] *Andreae Vesalii Tabulae anatomicae*, tres, fol. Vanderhaeghen (*Bibliotheca belgica litt.* V, 78) describes three plates which are, without title and place of publication, in the Grand-Ducal Library at Darmstadt. They are a reprint of plates 1, 2, and 3 of the *Tabulae anatomicae*, Venet. 1538.

On the basis of the following sentence which occurs in the preface, *Ipsum autem corpus picturae suis lineamentis ex elegantissimo reddidimus longé elegantius* ("the body itself and also the contours are reproduced in the most attractive manner"), Roth (pp. 122–24) believes that we have here the first three plates of the Cologne reprint, which as yet have not been seen by anyone. The above-quoted sentence must also occur in the Cologne reprint, even according to Vesalius himself. Vanderhaeghen is of the opinion, however, that these plates, according to the letter written to Oporinus by Vesalius in the *Fabrica* of 1543, constitute the Paris reprint. It is a fact that the Paris reprint consisted of three plates which represented the internal organs while the illustrations of the skeleton were missing, according to Vesalius, on account of the technical difficulties of the engraving. See De Feyfer, *Janus*, Amsterdam, XIX (1914), 442–43.

showed the skeleton from the front, from the back, and from the side, one plate illustrated the liver and the spleen with the portal vein, and the genitals of both sexes; another one showed the liver with the venae cavae and its tributaries; while still another illustrated the heart and the aorta with its branches. A plate on the nerves appears not to have been among them, but Vesalius had one designed in a hand drawing,

and this was published in Cologne in 1539 as a woodcut, but without his knowledge.[1]

[1] In 1874, the plates were reprinted in facsimile by Sir William Sterling Maxwell, with the title-page: *Tabulae anatomicae sex. Venetiis, sumptibus Joannis Stephani Calcarensis*, 1538, title-page, 61, 6 pl. eleph. fol. London, privately printed for Sir William Sterling Maxwell, 1874.

The plates correspond with the description given by Choulant. A copy was presented to the Surgeon-General's Library by Sir Sterling Maxwell and has been described by the late Dr. Robert Fletcher in the *Tr. Coll. Phys. Phil.*, 1909, 340–42. From the fact that these

[The first six Vesalian plates of the year 1538 had, on account of their great rarity, not been seen by Choulant at the time of his writing the chapter on Vesalius. Their description was based on conclusions drawn from comparisons of various reports. Later he saw the originals and satisfied himself that the description given above is in every way

perfectly correct. On the third plate representing a back view of the skeleton the following is printed on a small curved shield leaning against a felled tree trunk: *Imprimebat Venetijs B. Vitalis Venetus sumptibus*

plates show the traditional five-lobed liver, and that the skeletons and visceral schemata therein are far inferior to those in the *Fabrica*, five years later, Sudhoff argues a sudden leap in Vesalius' power of seeing things correctly, which may have been due to the fact that he had seen some of Leonardo's drawings meanwhile and profited by his study of them. This assumption is based upon the existence of a set of four skeletal figures, possibly by Leonardo, in the Uffizi, hand drawings which Sudhoff describes in the *München. med. Wochenschr.*, LVII (1910), 2210.

Joannis Stephani Calcarensis. Prostrant verò in officina D. Bernardi, A. 1538. On the lower margin of this third plate it stated that the plates are protected through *Privilegium* granted by the Pope, the Emperor, and the Commonwealth of Venice, against piracy. The first two plates and the last three have no such printed notice. All contain woodcut figures and are printed on one side only. In the copy before me, they are illuminated in colors, on a yellow background. Plate 1 shows on the right the frontal view of an erect skeleton with the right arm bent at the elbow joint so that the forearm points upward; the left arm hanging down; at the top is the title *Humani corporis ossa parte anteriori expressa;* on the left of the plate explanations and Greek, Latin, Hebrew, and Arabic nomenclature are given. Plate 2 shows a side view of the skeleton, in the same position as the former; to the left is a similar explanation; at the top the title: *Lateralis σκελετον figurae designatio;* on the lower margin of both these plates remarks are made about the number of bones in the entire body with the following distich: *Adde quater denis bis centum senaque habebis Quam sis multiplici conditus osse, semel.* Plate 3 shows a back view of the same skeleton. The skeleton is on the left side of the plate, the explanation on the right side; the title is: "*Σκελετον a tergo delineatum.*" The feet of all three skeletons are on grass-covered ground; the third plate has the above-mentioned tree trunk. On plate 4, only the lower two-thirds are given to the illustration, the upper one-third is devoted to text. The principal figure represents the liver with five lobes and the oblong spleen with the enlargement of the portal vein. Two smaller figures represent the genitals of both sexes with the abdominal blood vessels and the spermatic vessels; with the male genitals are also given the liver (with two lobes), the kidneys, and the urinary bladder; with the female genitals, the bottom of the uterus, curved and not divided into horns, the tubes leaving at the sides. A third very small figure represents the (urinary) bladder with the ureters, the seminal vesicle, and the vas deferens on both sides. The explanation of the larger illustration is given to the left of this, the smaller representations are without any explanation but have in place of it (as has the larger figure also) a title: *Jecur sanguificationis officina*, etc. *Generationis organa*, etc. Above the illustrations is a long dedication which is largely made up of complimentary expressions.

Plate 5 represents, in a woodcut, taking up the full length of the plate, the distribution of both venae cavae in the body (i.e., the entire venous system), including the five-lobed liver, and the right kidney. Explanations are on both sides of the plate. The title is on the upper

margin: *Venae cavae, iecorariae*, etc., *descriptio, qua sanguis omnium partium nutrimentum per universum corpus diffunditur.*—Plate 6 represents in an equally large woodcut, with explanations at both sides of the plate, the distribution of the aorta in the body (i.e., the entire arterial system), besides the undissected heart, and the two kidneys. Both internal carotids are shown above entering the Galenic rete mirabile from which the two chorioid plexuses of the lateral ventricles start forward. On the side (in the explanation) this is designated as: *Plexus recticularis ad cerebri basim, Rete mirabile, in quo vitalis spiritus ad animalem praeparatur*, while in the books of the *De corporis humani fabrica* (1543, pages 310, 621, 642; 1555, pages 501, 771, 796) this network is asserted to occur only in animals and to be wholly lacking in the human being. The title on the upper margin of the plate is as follows: *Arteria magna, ἀορτή*, etc. *ex sinistro cordis sinu oriens, et vitalem spiritum toti corpori deferens, naturalemque calorem per contractionem et dilatationem temperans.* On the lower margin of the three last plates the number of principal branches of the portal vein is given as seven, those of the venae cavae as one hundred and sixty-eight, those of the aorta as one hundred and forty-seven.

It thus follows from an inspection of these six original plates that they are indeed nothing else but fugitive sheets, as was stated on page 173; that as assumed before on page 173, no neurologic plate is among them; that none of the illustrations have been inserted in *De corp. hum. fabrica* or in the *Epitome;* and that Vesalius, on the contrary, corrected later much that was represented on them and chose for his drawings more beautiful and freer forms. It is also evident that the skeletons represented on these six plates are much more correct and more beautiful than those contained in Wechel's *Osteotome*, and that Mecker's reproductions are complete and fairly faithful copies. The artist of the three skeletons in Ryff's *Anatomy* evidently had those represented in Vesalius' six plates or in Mecker's reproductions before him and copied them poorly.]

Epistola docens venam axillarem dextri cubiti in dolore laterali secandam; et melancholicum succum ex venae portae ramis ad sedem pertinentibus purgari, Basil., in officina Roberti Winter, mense Aprili, 1539, 4°, 68 pp.[1]

[1] *Idem, Apud Cominum De Trinido Montisferrati. Anno*, 1544, 8°, 66 pp. This a reprint of the preceding one. Haeser (II, 36) gives *Patav.* 1544, 8°. It is dedicated to Nicholas Florenati, physician to Charles V, and is dated, *Patavij, ex aedibus filiorum Illustrissimi Comitis Gabrielis ab Ortemburg. Calen. Januarij. Anno salutis M.D.XXXIX.*

According to Roth (p. 95) this letter was written in 1536 at Louvain, but was not published until 1539. It came about through a request of Nicholas Florenati who wanted to

On page forty-one is a wood engraving illustrating crudely the veins of the breast. This has not been taken into the complete edition of the works of Vesalius, as prepared for publication by Boerhaave and Albinus.

De humani corporis fabrica libri septem, Basil., ex officina Joannis Oporini, 1543, mense Junio, fol. max., *12 and 663 pp. with 18 unnumbered leaves.*[1]

On the title-page is a large woodcut: Vesalius standing beside a dissecting table upon which there lies a female body with the abdominal cavity opened; Vesalius' left hand with the forefinger raised, his right hand holding a pointer and resting upon the cadaver; at the head of the body a skeleton standing erect with a long staff in its right hand. Surrounding these is a large assembly of people of different classes. On the left, in the window, stands a nude man clinging to a column, while at the bottom, on the right, we see a living dog brought in. Above, upon the architecture and to the left, we find Johann Oporinus' monogram Φ; in the center the three weasels (Vesalius' coat-of-arms) upon a shield the margin of which shows three buttons. At the bottom the picture is finished with a curved and decorated shield, upon which the privilege (*privilegium*) is printed. The title-page is followed by the dedication to Charles V, dated *Patavii, Calendis Augusti*, 1542, and Vesalius' letter to Oporinus, dated *Venetiis, nono Calendas Septembres*, from which I have already quoted a few passages; others I shall mention later. After that, at the end of the introductory remarks, a bust of Vesalius, showing Vesalius as he demonstrates the muscles of the arm of a female cadaver. On the edge of the table these words are engraved: *An. Aet., XXVIII.M.D.XLII. Ocyus, iucunde et tuto.* Partly printed between the text, partly printed on separate pages, there now follow the proper wood engravings illustrating the anatomy. On page 237 (correctly, page 235), we find all the instruments for dissecting brought together in one illustration. Among the anatomic figures there should be: three entire skeletons (pages 163–65), fourteen illustrations of the entire muscle-manikin (pages 170–208), two pictures of the veins and arteries (pages 268 and 295), and two larger folded sheets (pages 313, 353).

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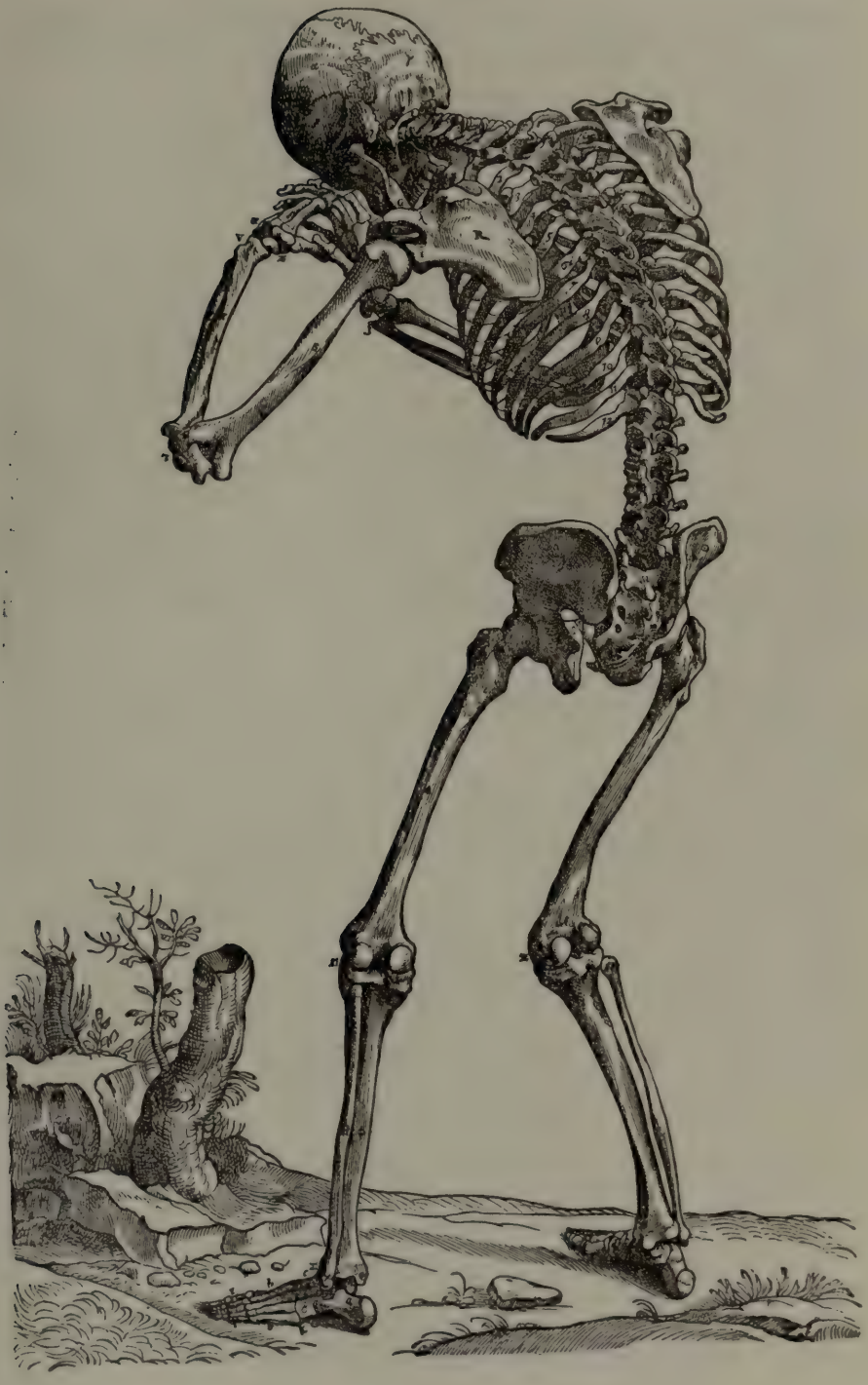
know Vesalius' stand with regard to phlebotomy in pleuritis, a burning question in those days. Besides this he states, at the end, his relations to Jan van Calcar. Both editions contain a wood engraving, *venae thoracem nutrientes*. De Feyfer, *loc. cit.*, 448, 2.

[1] *De humani corporis fabrica, lib., VII, ad Carolum Quintum Imperatorem, Lugduni, apud Ioan. Tornaesium*, 1552, 16°; Part I, 981 and 74 pp.; Part II, 833 and 76 pp. A pocket edition of the *Fabrica*, 1543, in two parts, mutilated here and there. The illustrations are omitted except on pages 130, 131, and 132 of Part I. De Feyfer, *loc. cit.*, 454, 2.



On account of the date of the dedication, this edition is sometimes said to have been published in 1542, which, however, is incorrect. See also Weigel, no. 3513.

Suorum de humani corporis fabrica librorum epitome. Colophon; *Basil. ex officina Joannis Oporini, Anno 1543, mense Junio;* large fol. 14 leaves.[1]

This work is very rare and is incomplete in most of the existing editions, because it never was intended to be bound together, but rather for use in separate sheets, as appears from the concluding paragraph on sheet M. It should, therefore, also be included in the group of fugitive sheets (*fliegende Blätter*). The twelve first sheets bear the signature A–M and are printed on both sides. The two last sheets, following the concluding paragraph, are without signature and are printed on one side only. All the individual parts are intended to be cut out, and are to be pasted together into two whole figures. Elaborate directions for this procedure are given. These last two sheets, therefore, are most frequently given. The *Epitome* appeared in the same month and year, but probably after the principal work, as appears from the text of the dedication:

> Quae quoad fieri licet succincte ac minus operose ea exprimat, quae septem huius argumenti libris diffuse complexus sum, quorum haec *Epitome* semita quaedam aut appendix etiam iure habebitur, capita quae illis demonstrantur acervatim comprehendens, etc.
>
> "This, in so far as it may be done, is to express briefly and with less effort those matters which I have discussed at length in the seven books of this treatise. The *Epitome* of these will be rightly regarded as a sort of short cut or appendix, including in a single chapter those matters which are explained in the previous books."

In the larger work the *Epitome* is not mentioned. The title-page is made from the same plate as that in the edition of the principal work of 1543, and so are also Vesalius' picture on page 11 (G), the skeleton, page 17 (K), the nerves, page 21 (M), and the chief figure as well as several smaller figures among the sheets without signature. On the other hand, we do not find in the principal work the five myologic plates (pages 12–16, G, H, I), and the nude figures of a man and a woman

[1] The following editions of the *Epitome*, 1543, contain no illustrations:

a) *Parisiis, apud Andream Wechelum, sub Pegaso, in vico Bellovaco*, 1560, 8°, 142 pp., dedicated to Philip II, and taken from Geminus. In addition has, *Externarum humani corporis sedium partiumve citra dissectionem occurrentium appellationes;*

b) *Witenbergae, typus Zachariae Lehmani, 1582*, 8°, 108 pp., probably a reprint of the text of the London edition of 1545;

c) *Witenbergae, impensis Bechtoldi Raben, typus M. Georgij Mulleri*, 1603, 8, 110 pp., a reprint of the above. De Feyfer, *loc. cit.*, 456, 7; 457, 9; 457, 10.

(pages 18, 19, K, L), the latter especially well drawn and beautifully executed. These seven plates have been added in the *Epitome*. The dedication to Crown Prince Philip (later King Philip II of Spain) is signed *Patavii idibus Augusti* 1542, and this sometimes led to the incorrect assumption that the *Epitome* appeared in 1542. [The *Epitome* is indeed mentioned in a passage of the principal work (*De corp. hum. fabr.* II. VII.), that is in the dedication, where in both editions, we read:

quemadmodum in *Epitome* praestiti: quam veluti horum librorum semitam ac in illis demonstratorum indicem praeparavi,
"as I have shown in the *Epitome:* which I have prepared as a short cut to these books and an index of the matters shown therein."

This also confirms the statement that the *Epitome* came out later than the principal work, and that at the publication of the latter he had the former only in preparation. The same facts are brought out in a letter which Vesalius wrote to Oporinus on August 24, 1542 (p. 171). The wood blocks for the principal work were shipped, together with those for the *Epitome*, from Padua to Basel, which indicates that the latter had not yet been published. And here, too, the principal work is mentioned before the *Epitome*.] In the *Epitome* the myologic figures are presented rather according to their innermost positions, and on one side of the body different positions are shown than on the other side. The figures are set on shorter bases which do not occupy the whole width of the sheet. Weigel, no. 16375.

The text of the *Epitome* and a commentary are contained in *Andreae Vesalii Epitome anatomica, cui accessere notae ac commentaria P. Paaw, Lugd. Batav.* 1616, 4°, 224 pp. The illustrations are missing, and in their place we find 13 small well-engraved copperplates.

[An edition similar to Paaw's with commentary by Nicolaus Fontanus, but with the dedication and the myologic figures omitted and many inferior reprints from the principal work added, was published in *Amstelod., apud Joann. Jansonium* 1642, fol. It seems, however, that the copperplates had already been used, particularly for a German work.[1]]

De humani corporis fabrica libri septem, Basil., per Joannem Oporinum. Colophon: *Basileae, ex officina Joannis Oporini. Anno 1555, mense Augusto*, large fol., 12 and 824 pp. with 23 unnumbered leaves.

The second edition of the principal work prepared for publication by Vesalius himself, slightly elaborated in the text and provided with a

[1] *Idem. Amstelreodami, apud Henric-Laurent.*, 1633, 4°, a reprint of the edition of 1616.

few new smaller woodcuts, pages 17, 18, 79, 121, 196, 560, 588, and 674. The remaining plates are taken from the wood engravings used in the edition of 1543. Thus, we find *Lib. II. musculor. tab. III* on page 218 to have the same crack in the lower left-hand corner as in the former edition on page 178. On the other hand, the title-page is an absolutely new woodcut. The designer had the original plate in mind, but has repeatedly taken liberties. The skeleton holds a scythe, the man at the left near the window is clothed, at the lower right-hand corner we see two animals brought in. Oporinus' monogram is missing and the coat-of-arms with the weasels shows on its margin ten buttons. The lower shield with the Privilege is a board intended for vivisections. Vesalius' face is turned more to the front, his right sleeve fits tightly, the genitals of the cadaver are covered by the parts of the bladder turned down and aside. Otherwise we find the same arrangement of the figures. The anatomic illustrations of the *Epitome*, which are missing in the edition of the principal work of 1543, are not found here either. The impression of the woodcuts is often clearer and more beautiful than in the previous edition; some of the figures have been somewhat improved upon in the cutting and in the lettering. The presswork is more splendid; the fancy initials throughout are larger and more beautiful and are also adorned with drawings different from those of the first edition. This second edition therefore has, especially for practical purposes, advantages over the first on account of additions in the text and in the illustrations and particularly on account of its more splendid makeup. At the end we find errata, alphabetical index, colophon and the printer's device. See Weigel, no. 4017. This second edition appeared later in smaller size:

De humani corporis fabrica libri septem, Venetiis, apud Franciscum Franciscium Senensem et Johannem Criegher Germanum, 1568, small fol. 12, 510 and 45 pp.

The woodcut title-page and the bust of Vesalius are missing. The remaining woodcuts are of smaller size, and are executed most carefully though less clearly, but very neatly, by Johann Criegher (Krüger) of Pommern, who is mentioned on the title-page. See Weigel, no. 6809.

This edition was reprinted from the same plates and republished at *Venet., apud Joan. Anton. et Jac. de Franciscis.* s.a. fol.; 8, 510 and 45 pp.

Under a special title is inserted: *Universa antiquorum anatome, ex Rufo Ephesio tribus tabellis* (tables, not figures) *explicata per Fabium Paulinum, Venet.* 1604, fol.

This copy of Vesalius' work corresponds page by page with the edition of 1568, but is actually a new edition.

Among the complete editions of Vesalius' works which appeared with and without illustrations, the following is distinguished by its beauty and careful preparation:

Andreae Vesalii Opera omnia anatomica et chirurgica, cura Hermanni Boerhaave et Bernhardi Siegfried Albini, Tom. I. II. Lugd. Batav., apud. Joann. du Vivié et Joann. et Hermann. Verbeek, 1725, large fol.

In this edition, the woodcuts of the principal work and of the *Epitome* are very beautifully copied and engraved on copper in the original size by Jan Wandelaer. The title-page in copper is engraved after the edition of 1543. Oporinus' monogram, however, is omitted and the architecture is slightly changed.

The remaining wood engravings are copied entirely, with all the additions, from the edition of 1555. All the wood engravings of the *Epitome* are re-engraved, without exception. Vesalius' *Epistola docens venam axillarem*, etc., is omitted, also the Vesalian plates of 1538; on the other hand, it contains *De radice chynae, Gabr. Fallopii observationes anatomicae* (against Vesalius) and *Vesalii anatomicarum G. Fallopii observationum examen* (a rejoinder), and the posthumous *Chirurgia magna* in Vesalius' own handwriting which contains a number of small illustrations.

[Besides this edition by Albinus, there should be mentioned still another special edition on osteology: *Andreae Vesalii Tabulae ossium humanorum. Denuo edidit, earumque explicationem adauxit Eduardus Sandifort, Lugd. Batav., ap. S. et J. Luchtmans, P. van der Fyk et D. Vijgh*, 1782, fol., with 3 and 30 pages of text and 27 copperplates by Jan Wanderlaer; cf. Weigel: *Kunstkatalog. no. 18246.*]

The University of Louvain is in possession of a magnificent parchment copy,[1] alleged to be the dedication copy, of Vesalius' *Anatomy*, which contains colored figures, and among them some which consist of several parts arranged one above the other, and pasted together, so as to be turned over consecutively. (Ebert: *Bibliogr. Lexikon*, no. 23537; Burggraeve: *Études*, p. 75.) These latter figures cannot be other than those of a male and a female body put together from the last two pages of the *Epitome*, and cut out according to Vesalius' own instruction.

[1] This copy was burnt when the University Library of Louvain was destroyed in August, 1914. The British Museum in London has a similar copy. Choulant's statement is correct that it was the *Suorum de humani corporis fabrica librorum epitome*, 1543, and not the *Tabulae anatomicae, Venetiis*, 1538, as is sometimes stated.

The original wood engravings of Vesalius' work were used for the illustrations in the following works:

Von des menschen corpers Anatomey, ein kurtzer aber vast nützer Ausszug, auss D. Andree Vesalij von Brussel bücheren, von ihm selbs in Latein beschriben, vnnd durch D. Albanum Torinum verdolmetscht. Colophon: *Gedruckt zu Basel, bey Johann Herpst, genannt Oporino, 9. August 1543.* large fol., 19 leaves. Namely, title-page, Sign. A–P, P and 2 leaves without signature.

A very rare German edition of the *Epitome*, compiled by Alban (Zum Thor., or Thorer, of Winterthur) (b. 1489–d. February 23, 1550), professor of medicine at Basel, designed, as was the Latin *Epitome*, for use in separate sheets. It contains the woodcut title, representing the public dissection of 1543, Vesalius' bust, besides eleven sheets of anatomic illustrations: The skeleton, the plate of the nerves, five myologic plates, the two nude figures and the two unsigned sheets, intended to be cut up; in addition to these illustrations, which the Latin edition of the *Epitome* contains, some smaller cuts from the larger work of Vesalius have been added to some of the plates or inserted in the text. These latter are not contained in the Latin edition. On the title-page below is also to be found a preface: *Dem gutwilligen läser. Diese kurtze anzeygung der Anatomey*, etc. Sheet A contains the German translation of Vesalius' dedication to Philip, Padua, August 13, 1542, and also a German dedication to Christoph, duke of Wirtenberg and Teck, signed Albanus zum Thor, Basel, August 5, 1543; Sheet G has on its back the first myologic plate; the skeleton and the two nude figures are on Sheets N and O. The illustrations in this German edition of the *Epitome*, which is even rarer than the Latin, are equal in beauty. The copy spoken of in Weigel's *Kunstkatolog*, no. 14144, is now in the large private collection of the King of Saxony.

Andreae Vesalii Bruxellensis—Zergliederung Dess Menschlichen Cörpers. Auf Mahlerey und Bildhauerkunst gericht. Die Figuren von Titian gezeichnet. Augspurg, gedruckt und verlegt durch Andreas Maschenbaur, 1706, fol.; 16 leaves.

On the title-page we find the five skulls from the principal book, at the end five other illustrations pertaining to the skull, besides these, three skeletons, and four muscle-manikins from the same book, also four other muscle-manikins, and the two nude figures from the *Epitome*. A second edition by Maschenbaur was published under a similar, but more elaborate title, in *Augspurg*, 1723, folio, fourteen sheets.

The plates are the same; the five complete skulls, however, are not on the title-page, but at the end of the book; of the five other figures pertaining to the skull, two are omitted. All the illustrations here are markedly duller than in the Latin and German original editions. It has been mentioned before that Titian did not draw the figures. See Weigel, no. 14145.

Heinr. Palmaz Leveling: Anatomische Erklärung der Original-Figuren von Andreas Vesal, samt einer Anwendung der Winslowischen Zergliederungslehre in 7 Büchern, Ingolstadt, bei A. Attenkhouer, 1783, fol., 28 and 328 pp.

The chief physician (*Protomedicus*) von Woltter had acquired, probably from Maschenbaur's legacy in Augsburg, all the original woodcuts from Vesalius' anatomic works. However, the eighth muscle plate was replaced by an inferior copy, showing the objects reversed from left to right; twelve smaller drawings, the blocks of which had been lost, were re-engraved, and fairly well done by a Munich artist for the use of this edition. Vesalius' bust was not among the collection and is, therefore, missing in this edition. Moreover, the work contains the older woodcut title of 1543 and all the woodcuts of the edition of the chief work of 1555; from the *Epitome* only the illustrations of the two nude figures are taken. The illustrations are rather dull, being made on paper altogether too coarse. This work was prepared by Leveling at Woltter's request; the edition comprised fifteen hundred copies. See Weigel, no. 4918.

It seems that soon after the publication of Vesalius' first plates of 1538 several similar anatomic illustrations (earlier imitations of those plates) appeared with which Vesalius was little satisfied. Even in the first edition of his chief work of 1543 he complains in a letter to Oporinus, written probably in 1542, and which is dated *Venetiis, nono Calendas Septembres*, of these imitations which were made in Augsburg, Cologne, Paris, Strassburg, Marburg, and Frankfort:

Nam quid principum decreta apud bibliopolas, et in omnibus angulis nunc densissime satos typographos valeant, abunde in meis Anatomicis tabulis ante annos tres Venetijs primum impressis, et postmodum misere passim depravatis, maioribusque interim titulis exornatis, est animadvertere. Augustae enim, mea ad Narcissum Vertunum—subducta epistola, nescio quis rabula Germanice est praefatus et—me coegisse in sex tabulas falso asserit, quae Galenus pluribus quam 30 libris diffuse complexus est—praeterquam quod Venetam sculpturam perverse istic sunt imitati. Hoc Augustano sculptore longe rudior imperitiorque extitit, qui Coloniae iisdem tabulis manum admovit—quum tamen (eius figurae) et picturam valde corruperint et nervorum delineationem parum feliciter imitatam adiecerint, quam

ego—uni atque alteri amico, qui id tantisper dum ipse eam ederem a me expetebant, ruditer delineaveram. Parisiis tres priores eleganter expresserunt, aliis interim propter sculpturae, uti coniicio, difficultatem omissis. . . . . Argentinensis ille—de studiis pessime est meritus, quod tabulas, quae nunquam satis magnae studiosis proponi poterunt, tam foede contraxerit et turpissime pictas ac praeter omnem rationem circumscriptas cum Augustani versione tanquam suas emiserit. Huius gloriae is invidere visus est, qui undecunque citra delectum compilatis ex aliorum libris imaginibus, Marpurgi et Francofordiae eius generis libros adhuc emittere pergit, etc.

"For what effect the decrees of rulers have among the booksellers and among printers who are now thickly planted in every corner, one may observe to perfection in the case of my books of anatomy, which were printed for the first time at Venice three years ago and afterward wretchedly garbled in all quarters, and in the meantime equipped with more pretentious titles. For at Augsburg, having purloined my letter to Narcissus Vertunus, some unknown hack wrote a preface in German, claiming falsely that I have squeezed into six books all that Galen had diffusely treated in more than thirty books—not to mention the botching of the Venetian engravings there. Another workman, far more unskilled and ignorant than the engraver at Augsburg set his hand to these same engravings at Cologne—though his figures completely spoiled the pictures (in my book) and included, besides, an outline of the nerves deplorably copied, which I had roughly sketched to one or two friends who requested me for it during the time pending publication by myself. At Paris they printed the three first plates in exquisite fashion, omitting in the meantime the others, because of the difficulty of the engraving, as I conjecture. . . . . The fellow at Strassburg played a scurvy trick on scholars in that he so shamefully cramped the engravings which could not have been too large for the best results to scholars, and issued them as his own, wretchedly reproduced, and reduced in size out of all reason, with the text of the Augsburg version. His glory was begrudged him apparently by that other who, indiscriminately, looting from every quarter, pictures from the books of others, insists upon issuing books of this sort at Marburg and Frankfort," etc.

Dryander might be one of the latter and of the two last-named printing places, the printing establishment of Egenolph is probably referred to; the Strassburg publisher is most likely Ryff; the one from Augsburg perhaps Necker; the one from Cologne, Macrolios or some other unnamed person; the Paris copies, possibly by Wechel, are not known to me. It is certain that immediately after the publications of Vesalius' first six plates and before the appearance of Vesalius' chief work and of the *Epitome* (that is to say, between 1538 and 1543), several imitations were published. To these belong the following:

Aegidius Macrolios: Cerebrum animalis facultatis fons et principium, sensum voluntarium per nervos communicans ab se et dorsali medulla enatos universo corpori, s.l. et a. (Cologne, 1539), fol.

A sheet, printed on one side only, represents the brain in its natural size, the upper part is cut open horizontally in such a manner that the

two lateral ventricles become visible; beneath the brain are the cranial nerves, also the tongue and a piece of the palate; among the nerves the vagus, with its branches in the thoracic and abdominal cavities. Everything is drawn in a bold and free manner, the nerves are unnaturally enlarged, some of the words and the letters are cut in wood, other words are printed; the entire woodcut in the copy before me is colored red. The Latin explanation is printed in italics on the left side; a German explanation is not given. On the right side we read:

Aegidius Macrolios Medicinae apud Agrippinam Coloniam professor Anatomices studiosis. Andreas Vesalius, quo nemo post Galenum in anatome diligentius et uerius versatus est, tabulis aliquot superiore Anno editis maximam commoditatem studiosis, quibus non datur ἄντοψιας copia, creavit. Sed ut animus hominis docti ociosus esse nequit, ita singularis industria, ab eodem istam quoque tabulam, quae nervorum syzygiam septenariam, sensuum scilicet instrumenta et loca, ob oculos euidentissime ponit, elegantissime expressit. Eam nos dudum nacti, quanquam depictam tantummodo, uerum adeo concinne, ut arbitrer authorem in omnium manibus illam esse optauisse, typographis tradidimus ne soli nos, quod plerique per inuidiam faciunt, thesauro tali frueremur. Cur enim non thesaurum appellem quod ingeniosam naturae machinam exprimit et docet? Nec priores sex tabulae, quae uenarum, arteriarum et sceleti imagines dant, quicquam habent tam ingeniosum, quod cum prima ista (Sic enim nuncupare libet, quod prima hominis, et ueluti principia depingat) sit comparandum. Valete.

"Aegidius Macrolius, Professor of Medicine at Cologne, to students of anatomy. Andreas Vesalius, than whom none since Galen has been a more conscientious and genuine student of anatomy, by several books published last year, has conferred an inestimable benefit upon scholars (who were hampered by lack of material). But, just as the mind of the scholar cannot be idle, in the same way unparalleled industry on the part of the same man has reproduced with the greatest nicety a work which sets forth with the most absolute clearness the sevenfold syzygy of the nerves, that is to say, the instruments and seat of all the senses. We came possessed of this sometime ago, merely in sketch form, but so neatly done that I believe the author desired it to be in the hands of all, and we have accordingly handed it over to the printers that we may not, as many, actuated by envy do, gloat over such a treasure in private. For why should I not call that a treasure which reproduces and explains the ingenious machine of nature? And the six previous books, which give pictures of the veins, the arteries and the skeleton, contain nothing sufficiently ingenious to deserve comparison with this chef-d'œuvre, (for I like to call it that since it represents the chief and, as it were, the principal parts of man). Farewell."

This shows that the sheet must have been published in 1539, that the publisher, Macrolios, must have had only Vesalius' hand drawing or a copy of it in his possession, which he had engraved and reprinted with explanations, and, furthermore, that this plate was not among the first six Vesalian plates which presented only the systems of the veins and arteries and the skeleton. With such an assumption agrees what

Vesalius himself says of this Cologne imitation in the foregoing letter to Oporinus, i.e., that in Cologne they added to the other six plates a *Nervorum delineatio*, which he had rather hastily designed and had shown to a few friends. This again would indicate that the other six plates

must also have been copied (see also page 189), and this figure of the brain added to them. The name "Macrolios" was not known to Vesalius; the latter seems not to have seen the very rare sheet above described, but merely a copy of it. But that the sheet by Macrolios is actually one of Vesalius' illustrations becomes irrefutable from the fact that, in the fourth book of the chief work, on page 319, of the edition of 1543, and

on page 512, of the edition of 1555, we find a figure which evidently is an elaborated and improved redrawing of Macrolios' figure. [The plate by Macrolios is mentioned nowhere, and the description and reproduction were prepared from a copy, at that time in Choulant's possession, of the undoubtedly very rare originals.]

Jobst de Necker: Ein gar künstlich allen Leib- und Wundärzten nützliches Werk in 6 Figuren mit Innhalt aller Blut- Schlag- und Flechsadern samt den Gebeinen des ganzen Leibes. Augsburg, 1539, fol., 6 leaves.

The work of the Augsburg wood engraver, Jobst, or Jost de Necker, de Negker, Denecker, Dennecker, Donnecker, Dannecker, of Augsburg, is mentioned by Haller (I, 180), and according to its title dealt with veins, arteries, and nerves; it is by all means the truest and best copy of Vesalius' first six plates. Among those plates, however, there were no illustrations of the nerves. Since such are expressly mentioned on the title of Necker's book, *Flechsadern*, it may be that even here Macrolios' sheet was inclosed. This again would contradict the fact that only six figures are indicated and that Vesalius first mentions this sheet in connection with the Cologne copy. But perhaps his Augustanus is not Necker, but another person not named. It is also probable, and this is particularly plausible, that Macrolios' sheet was actually added as a seventh plate.

Ein gar künstlichs, allen Leyb vnd Wundärtzten, auch andrer künsten Liebhabern, hochnützlichs Werk in sechs Figur gebracht, mit jnhalt aller blutschlag vnd Flachssadern, sampt den gebaynen des gantzen Leybs, etc. s.l. et a. (Cologne) fol., 6 leaves, each printed on one side only.

The first sheet contains the above title, then a preface in which is said:

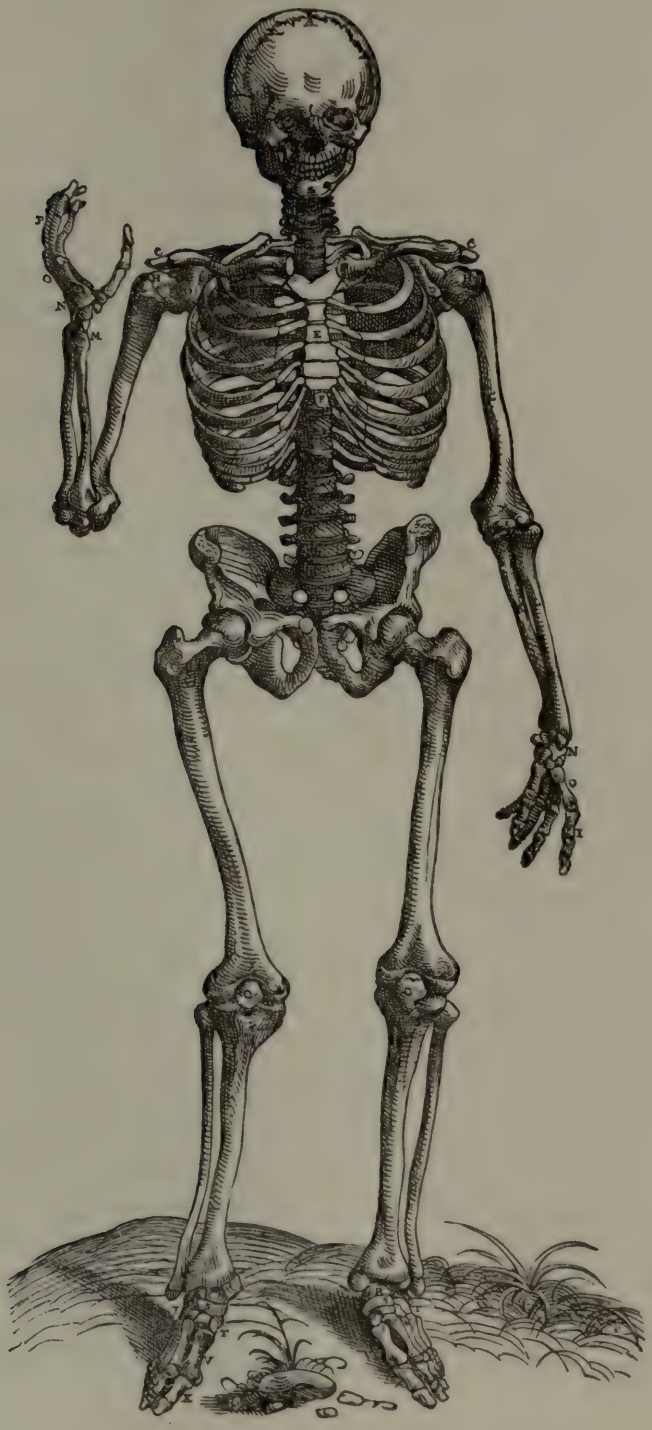
Also hat Stephanus Intemplaeus in sechs Figur gebracht, was Galenus in sechs gantzen, subtilen, auch hochnützlichen büchern gehandlet hat, Und yetzund ist durch Andream Wessalium in sechs künstliche un nützlich Figur mit herlichem verstand zusamen getragen, was durch den Galenum wol in dreissig, oder noch mer büchern lang und vil geschriben ist, welches künstlich werck durch Andream Wessalium Lateinisch beschriben, Darnach auss verlegen und anrichten des künstreichen Malers Joannis Stephani durch den Bernardum Vitalem ein Venediger mit fleyss in den Druck gebracht ist worden.

"So has Stephanus Intemplaeus brought into six figures what Galen treated in six entire, clever, and most useful books. And now has been brought together by Andreas Vesalius, in six artistic and useful figures, and with wonderful understanding, what Galen required thirty or more long and elaborate volumes to discuss; which work is explained in Latin by Andreas Vesalius and was prepared by the artistic painter Johannis Stephanus and carefully printed by the Venetian Bernardus Vitalis."

Below the preface a rather large engraving, showing the liver and the spleen, with the portal vein and its branches, and also three smaller engravings, showing the genitals of the two sexes. The second sheet contains a large woodcut: The liver and the two venae cavae, with their roots. The third sheet shows on an equally large woodcut, heart and kidneys, and the aorta with its branches. Three other sheets show the skeleton viewed from the front, the back, and the side. On all the sheets the explanations are given, on the right in German, on the left in Latin, the latter in italics. The engravings are effective, and those of the skeletons are particularly deserving of praise. The anatomy, however, is still very pre-Vesalian, the liver being shown with five or six lobes, the heart as situated directly in the center, the *rete mirabile* is reproduced after the manner of Galen; the uterus is now shown without horns. It is quite possible that Vesalius, in 1538, still drew in that manner, or that the copyist improved upon his manner according to a preconceived idea. The skeletons are colored gray, the landscape background on which they are placed is illuminated in the copy that lies before me, just as the figures of the viscera show colored illuminations. According to the title, we should find in this work veins, arteries, and "*Flechsadern.*" The latter should be the nerves which, however, we would not find on the plates if Macrolios' sheet had not been inclosed as a seventh plate. With this, indeed, the indicated number of six plates does not correspond, yet Vesalius expressly mentions that the Cologne reprint contains the plate of the nerves. Necker's name is not mentioned anywhere, which leads one to assume that this edition is only a copy of his work.[1] The faulty title seems also to point toward this possibility. Of another edition of this work I have only one sheet, the skeleton seen from the front; the woodcut is not the same, yet the drawing is, even in the accessories; obviously, this plate was copied by a still better artist directly from Vesalius' engraving. It is on the whole freer and more artistic and in its details truer to nature. There is no illumination, and the plate might be older than the afore-mentioned edition. It is very probable that it belongs to the original work by Necker. Explanations are also given, on the right in German, on the left in Latin, the latter, however, not in italics, but in Roman letters; the Latin text is absolutely the same.

Des allerfürtrefflichsten, höchsten vnnd adelichsten gschöpffs aller Creaturen—Das ist, des menschen—warhafftige beschreibung oder Anatomi

[1] Roth (pp. 122–23) considers this edition an Augsburg copy after the Augsburg plagiarism.



—erstmals inn Teutsche sprach verfasset—Durch M. Gualtherum Hermenium Ryff, Argentinum, Medicum. 1541. Colophon: *Strassburg, bey Balthassar Beck*, fol., 6 and 73 leaves; Gothic type.

This contains, including repetitions, twenty-five anatomic plates in woodcuts; of these, about ten are taken from Dryander (*anat. capit.* 1537), but redrawn and enlarged; the other fifteen contain entire bodies; among them the skeleton from the front, from the back, and from the side, in very poor proportions and drawn with a rather inferior understanding of anatomy. The above-mentioned three skeletons obviously served as models; sitting figures with open thoracic and abdominal cavities and a crude representation of the viscera, two muscle-manikins, two reproductions of the blood vessels of the whole body, one plate representing anatomic instruments, fifteen smaller figures from Eucharius Röslin, showing the positions of the fetus, and finally a schematic reproduction of the eye. One should not presume from the bad drawings that Vesalius' reproductions served as a basis for the anatomic plates; yet the above-quoted words of Vesalius seem to refer to this work. Other illustrations of this work are based on Berengarian reproductions. Ryff was not an anatomist, had no fixed habitation, made his livelihood through the compiling of medical treatises for the various branches of medical science without having much knowledge of it himself. Altogether, he was a shameless plagiarist.[1]

From these earliest imitations of Vesalian figures we must distinguish those later imitations which were published after the appearance of the chief work (i.e., after 1543), and which are, in some cases, actually announced as editions and reproductions of Vesalius' works. Among these are to be mentioned:

Compendiosa totius anatomiæ delineatio, aere exarata: per Thomam Geminum, Londini, in officina Joanni Herfordie, 1545, *mense Octobri*, large fol., 1 copperplate title-page, 44 printed leaves and 40 anatomic copperplates; in all 85 unnumbered leaves.

The illustration of Vesalius' public dissection and his bust are missing; the copper title-page here given is composed of a multitude of allegorical figures in separate panels, with the coat-of-arms of England in the center. From the *Epitome* only the two nude figures and the one sheet designed to be cut apart are taken. All the rest is from the chief work. The copper engravings are neatly and carefully executed but by no means equal the beauty of the Vesalian woodcuts nor the exactness of their

[1] *Idem, Anatomia omnium corporis partium descriptio*, Paris, 1543.
Idem, Description anatomique de toutes les parties du corps humain, Paris, 1545, Haller, I, 189. According to Roth, p. 122, this edition does not exist.

drawings. Gemini, of Leeds, who calls himself here *Geminus Lysiensis*,[1] was himself an engraver, and also a printer; he probably made the title-page. It is supposed that the copper engravings in this work, done in the manner of Hogenberghe, were the first to appear in England, but nothing in the work points to this fact.[2] In the dedication to Henry VIII, Gemini merely calls this work: *Hanc anatomen, primam meam foeturam.* The text contains only the description and therefore is rather abbreviated. The work is of exceptional rarity; see Weigel, *Kunstkatalog*, no. 4920. But there are three editions. The first one of the year 1545, dedicated to Henry VIII; the second in English, translation by Nicholas Udall, dedicated to Edward VI in 1552, and the third one, dedicated to Elizabeth in 1559.

[The first edition of Thomas Geminus: *Compendiosa totius anatomiae delineatio*, Lond. 1545, fol., of which a description is here given, has the coat-of-arms of Henry VIII, probably arranged at his request and expense, and was dedicated to him. The second edition, with the English translation by Nicholas Udall, appeared in 1553 with a dedication to Edward VI, printed by N. Hyll. The third edition of 1559 has, in place of the removed Royal Arms, the portrait of Queen Elizabeth (the earliest after her accession), and is dedicated to her. This third edition[3] is said to contain a large woodcut, with the monogram R. S.

[1] Thomas Gemini, Geminié, or Geminus Thomas (fl. 1540–60), was evidently a foreigner living in England, probably an Italian. Nothing is known of his life or antecedents.

[2] Contrary to Choulant's statement this is one of the earliest books containing copper-plate engravings produced in England, having apparently been preceded only by the plates to Reynald's *Byrthe of Menkynde* in 1540, which have sometimes been also attributed to Gemini. A peculiarity of this book is that each folio was printed separately; evidently the press was too small to print a whole sheet on it. (Lowndes, II, 873.) The plates are supposed to have been some of the first rotary presswork done in England.

[3] This edition Gemini printed himself, having set up a press in Blackfriars. According to Sayle, Gemini was assisted in the publishing of this book by Nicholas Udall and Richard Eden. The same plates as were used in the first and second editions are here used again, with the addition of the large folding woodcut, which is sometimes met with separately, and which was incorporated by Gemini in his own work. Choulant did not see this work personally and his statement that the plate was only added, and perhaps only in one copy of the edition, is an error. W. M. Voynich, the London bookseller, in his ninth list of books published November, 1902, 962, *†3335, describes a remarkable copy of this third edition:

Gemini (Thomas) translated by N. Udall and others. *Compendiosa/ totius Anatomie delineatio,/ aere/ exarata: per Thomam Geminum./* Londini. 1559. Sign. BI, col. 1: (B) Ycause. . . . . At the end: ℭ Imprinted at London within the black fryars: by Thomas Gemini./ *Anno Salutis.* 1559. *Mense Septemb.* Folio. Gothic character with Italian passages. 511. incl. engraved title + 57 unnuml. 11 + 2 folding woodcuts signed R.S., 376×361 mm. (one of them with moveable pieces), + 1 folding copperplate engraving, 324×338 mm., + 39 full-page copperplate engravings; sign. (511., A^6, B^7, C–I^6, K^3); 62–64–68 lines. Woodcut initials.

This copy contains a duplicate of the large woodcut ——— *corporis humani partium. . . . . delinatio* and . . . . *anatomes interiorum mulieris partium* . . . . (two titles to one block), arranged with additional woodcut moveable pieces, representing the anatomy of the thoracic and abdominal cavities. This woodcut is not in the British Museum copy but is otherwise identical with it, with which it has been compared.

and the graver beneath it, and the title *Interiorum corporis humani partium viva delineatio.* It represents the anatomy of the thoracic and abdominal cavities with moveable pieces. This plate was probably only added, and perhaps only in one copy of the edition, for Geminus' work does not contain any other woodcuts. One might identify it with the fugitive plate published by Gourmont and Mathoniere in Paris: *Anatomie tres vtile,* etc. *par Maistre André Vesali,* since that plate has the same monogram and the same Latin title, with the English inscription: *Knowe thy self.* The block must have been cut in England and later have been brought to France where it was given a French title. But the plate with its obsolete anatomy can be attributed neither to Vesalius nor to Geminus; cf. John Jackson and William A. Chatto: *Treatise on Wood-engraving,* London, 1839, 8°, p. 503.]

The same plates were used again in:

Les portraicts anatomiques de toutes les parties du corps humain—par Jacques Grevin de Clermont en Beauuoisis, médecin à Paris, Paris, *chez André Wechel,* 1569, large fol., 8 and 106 pp., 40 copperplates.

This work therefore contains the same number of illustrations as Gemini's book; the plates, however, have already suffered a great deal. An earlier Latin edition of these plates appeared in Paris [*apud Andream Wechelum*], 1564, fol., under the title: *Anatomiae totius aeri inscripta delineatio.*[1] Grevin died in 1570. Weigel's *Kunstkatalog* no. 4921.

Anatomia Deudsch. Ein kurtzer Auszug der beschreibung aller glider menschlichs Leybs aus den buchern des—Andr. Vesalij—sonderlich wundärtzten Deutscher nation zu nutz ins deutsch gebracht. Gedruckt zu Nürnberg bey Jul. Paul. Fabricio, mense Augusto 1551, large fol.

Gemini's forty copper engravings are copied and are provided with German descriptions; below the dedication, Jacob Bauman signs himself as the editor. The same work appeared later under the following title:

Anatomia Das ist Ein kurtze klare beschreybung von der vsstheilung vnnd zerschneidung aller glider des Menschlichen Lybs, uss den Bücheren dess—Andr. Vesalij—widerumb von nuwem durch—Jacob Buwmann Wundartzt zu Zürych in Truck verfertiget. (Zürich) 1575; large fol.

[1] *a*) Copies of this edition, not seen by Choulant, are in the libraries of Göttingen, Halle, Bologna, München, Stuttgart, Dresden Royal Library, Bibliothèque Nationale, Paris, and Breslau. Another edition with changed date, is in the University Library of Göttingen and the Royal Library at Stockholm.

b) *Lutetiae Parisiorum apud Andream Wechelum,* 1565. De Feyfer, *loc. cit.,* 460, 18; 461, 19.

This contains eighty printed pages and forty copper engravings taken from the plates of the former edition; some copies are colored; the editor is most likely the same Bauman, mentioned above.

Anatomia—Andr. Vesalii—in qua tota humani corporis fabrica iconibus elegantissimis iuxta genuinam Auctoris delineationem aeri incisis lectori ob oculos ponitur etc. *Amstelodami, excudebat Joannes Janssonius*, 1617, fol.

This contains the same forty plates, taken from the plates used in Bauman's work; to the German inscriptions Latin ones are added. The copper title-page has two skeletons as shield-bearers, below the dissection and anatomic demonstration.[1]

Beschreibung und Anzeigung Mannes und Weibes innerlicher Glieder in zwölf Kupfer-Figuren verfasst und gezogen aus der Anatomie Andr. Vesalii, 1559, fol.

As appears from the title, this cannot contain Gemini's illustrations at all or, if any, only a part of them.[2]

(*Rogers de Piles et*) *François Tortebat: Abrégé d'anatomie accommodé aux arts de peinture et de sculpture*, Paris (1667), 1668, fol.

This is the earliest work on anatomy intended for the use of artists. It contains twelve plates engraved by Tortebat ranging in size from fifteen Parisian inches, three lines, to sixteen inches, two lines, in height, and from seven inches, eight lines, to nine inches, three lines, in width. There are three skeletons, seven myologic plates (three from the principal work and four from the *Epitome*), and the two nude figures. According to the Privilege and to a signature on the fourth plate, the work cannot

[1] An edition with Vesalius' portrait and the 40 plates from Bauman's *Anatomia*, was published under the title: *Suorum de humani corporis fabrica librorum epitome: opus perinsigne, nunc primum in Germania renata, hacque forma quam emendatissimè editum, anno* 1600. fol., and on the last page *Coloniae Agrippinae, typis Stephani Hemmerden, anno* 1601.

Another edition dedicated to Frederik-Hendrik, September 10, 1642: *De humani corporis fabrica epitome; cum annotationibus Nicolai Fontani, Amstelodami, apud Ioannem Ianssonium*, 1642, fol. The portrait of Vesalius and the 40 plates were taken from the foregoing edition but the clichés were retouched and a few of the inscriptions omitted. The title-page contains an anatomic lesson given by Vesalius before an audience of four persons. De Feyfer, *op. cit.*, 463, 23; 464, 25.

[2] According to the title, this edition is the predecessor of Clement Baudin's edition published at Lyons in 1560:

a) *Description et Demonstration des membres interieurs de l'homme et de la femme, en douze Tables, tirées au naturel, selon la vraye Anatomie de André Wesal*, Lyons, Clement Baudin, 1560, 4°. Contains twelve copperplate engravings with explanations, copied from the London edition of 1545; some reversed with abridged description after Vesalius.

b) *Idem*, Lyon, Clement Baudin, 1567. This edition corresponds completely with the preceding one. De Feyfer, *loc. cit.*, 468, 38, 39.

have appeared before 1668.[1] The edition, Paris, *chez Jean Mariette*, 1733, fol., has only ten copper engravings. The two nude figures from the *Epitome* are missing. Contrasted with the Vesalian figures, the engravings in this edition are reversed. The same is true in all respects of a French edition with ten copper engravings made by Petit, after the methods of chalk engravings, drawn by P. F. Leclere, Paris, *chez Jean.*, without date, fol.; on the last plate is inscribed: *An 7*, which would mean 1798 or 1799.

[The *Abrégé d'anatomie* mentioned here was written by Roger de Piles (b. Clamency, Nivernois, 1635–d. Paris, 1709) under the pseudonym *François Tortebat*, as he himself states in his *Cours de peinture par principes*, Paris, 1708, 8°, page 153; (in German: *Einleitung in die Malerei nach Grundsätzen*, Leipzig, 1760, 8°, page 121); Haller: *Bibl. anat.* I, 184. With regard to the work itself on artistic anatomy see Robert-Dumesnil: *Peintre-graveur Français*, III, 221. and Weigel: *Kunstkatalog no. 18258.*]

Reduced reprints of this work are likewise contained in the following book with twelve engravings:

Samuel Theodor Gericke: Kurtze Verfassung der Anatomie, wie Selbige zu der Malerey und Bildhauerey erfordert wird—erstlich ans Licht gegeben von Franc. Tortebat—nun aber in diese bequeme Form gebracht. Berlin, b. Rüdiger, 1706, fol.

The engraved copies by Lorenz Beger are eleven and one-half and thirteen and three-quarter inches in height. It is to be regretted that they are copied from Tortebat and not directly from Vesalius. They are inferior both in drawing and engraving and are reversed throughout.

Notomia di Titiano, dedicata all' illustr. Sign. Franc. Ghisilieri, Senatore di Bologna, per Domenico Bonavera. Also published under the title: *Liber anatomicus, Titianus invenit et delineavit, Dominicus de Bonavera sculpsit.* s.l. et a. fol.

This work is without any text and must have been published soon after De Piles' book. The engraver and editor, Domenico Maria Bonavera or Bonaveri, was born in Bologna about 1640, and was a pupil of Canuti. The eighteen illustrations are the well-known Vesalian plates which, at that time, were still attributed to Titian. Haller, II, 740.

[1] *Idem*, Paris, *chez Charles Antoine Jombert*, 1765, with modified text.
———, Paris, *chez Barrois l'aisne*, s.a.
Pirated editions:
Abrégé d'anatomie accomodé aux arts, chez J. B. Chepy, Paris, 1760, fol., abridged reprint after Tortebat with newly engraved plates; the figures measure 26 cm.;
Charles Antoine Jombert: Méthode pour apprendre le dessin, Paris, *chez L. Cellot*, 1784; the figures measure 23 cm.

Jacopo (Giacopo) Moro: Anatomia ridotta ad uso de' pittori e scultori. Vinegia, 1679, fol.

This contains nineteen outline plates after Vesalius, edited by Giuseppe Montani, with explanations. Added is a guide for the study of fresco painting. See Cicognara: *Catal.*, I, 59.

Andr. Vesalii: Tabulae ossium humanorum. Denuo edidit earumque explicationem adauxit Eduardus Sandifort, Lugd. Bat., ap. Luchtmans, van der Eyk et Vijgh, 1782, fol., 8 and 52 pp. and 24 copperplates.

These twenty-four copperplates were made from those which were employed for the Boerhaave-Albinus edition of Vesalius' work, as far as osteology is concerned. The order is changed, however. The text contains only the explanation of the plates.

[In the volume of *Anatomic Miscellanies*, which belonged to the Viennese ophthalmologist and professor Joseph Barth, and which was in the possession of the publisher, are contained the following: The first six plates from Vesalius *Epitome* of 1530, three sheets which must be counted among the fugitive leaves, a sheet from the Cologne reproductions of Vesalian plates, and a copper engraving representing two standing muscle-manikins, poor in anatomy and drawing, done in Italy about 1550 and based probably on a drawing by Baccio Bandinelli: As this book did not come into Choulant's hands until after this chapter was written, what is deemed essential is presented here.]

Information concerning Vesalius' life and works, besides that in the preface to the Boerhaave-Albinus complete edition, is given in the following:

Ad. Burggraeve: Études sur André Vésale, précédées d'une notice historique sur sa vie et ses écrits. Gand, chez C. Annoot-Braeckman, 1841. large 8°, 33 and 439 pp.; with the bust picture of Vesalius after the well-known woodcut in copper by Ch. Onghena and a facsimile in Vesalius' handwriting on a large inserted sheet (a medical certificate): a comprehensive and splendid work.

Notizia d'opere di disegno nella prima meta del secolo XVI. esistenti in Padova Cremona Milano Pavia Bergamo Crema e Venezia. Scritta da un Anonimo di quel tempo. Pubblicata e illustrata da D. Jacopo Morelli. Bassano, 1800, 8°, p. 232.

[*Ad. Burggraeve's Études sur André Vesale* has nothing pertaining to the bibliography of Vesalius' works and illustrations, although it is highly valuable on account of its many abstracts from Vesalius' writings and a few biographic notes drawn from Spanish sources.]

The beautiful painting by E. Hamman, of which A. Mouilleron and Schubert made a lithograph (Weigel, no. 17676), portrays Vesalius in his study.

[In addition to the plagiarists given by Choulant, the following authors used Vesalius' illustrations and writings for their own works:

John Banester (*Banister*): *The historie of man, sucked from the sappe of the most approued anathomistes in this present age, compiled in most compendious fourme, and now published in English, for the utilitie of all godly chirurgians, within this realme*, London, J. Daye, 1578, 4°, 112 ff. Contains poor illustrations, taken from Vesalius.

Johann van Beverwijck (*Beverovicius*): *Heelkonste ofte derde deel van de geneeskonste*, Amsterdam, Jan Jacobsz Schipper, 1660. Besides the illustrations from Vesalius, a muscle-manikin by Valverde, but reversed, and four plates from Harvey.

Johannes Bockelius: Anatome sive descriptio partium corporis humani ut ea in Academia Julia quae est Helstadii singulis annis publicè perlegi ac administrari solet, Helmstadii, 1585, 8°.

Idem. 1588, 8°. A compilation from Vesalius.

Bartholomaeus Cabrolius: Ontleedingh des menschelijcken lichaems. Eertijds in 't latijn beschreven. Nu verduytscht en met bijvoechselen als oock figuren verryckt door V(*opiscus*) *F*(*ortunatus*) *P*(*lemp*), Amsterdam, 1633, fol.

Idem. 1648, fol. Illustrations from Vesalius and Paaw; Paaw's copperplates were used.

Helkiah Crooke: ΜΙΚΡΟΚΟΣΜΟΓΡΑΦΙΑ, *a description of the body of man, together with the controversies and figures thereto belonging, collected and translated out of the best authors of anatomy.* London, W. Jaggard, 1616, fol. 1,000 pp.; the illustrations are from Vesalius, while the text is from Bauhinus, Casserius, Paaw, and Laurentius.

Idem, London, 1631, fol., 1,012 pp., contains a portrait of Crooke.

James Douglas: Nine anatomical figures, representing the external parts, muscles, and bones of the human body. The outlines taken from the figures of Vesalius and Bidloo, under the direction of James Douglas, London, W. G. Douglas, 1748, fol.,

From a remark in Douglas, *Bibliograph. anatom. specimen*, 1715, another edition is supposed to have been published in 1715. According to Roth this work must be exceedingly rare. He gives the date between the years 1706 and 1723. It is not given in Haller. De Feyfer is of the opinion that no such edition exists.

Willem Goeree: Natuurlijk en schilderkonstig ontwerp der menschkunde, Amsterdam, 1683, 8°.

Idem, Amsterdam, 1730, 8°; copper engravings after Vesalius, Choulant *Graph. incunab.*, 153.

Bernardino Montaña: Libro de la anathomia del hombre, nuevamente compuesto por el doctor Bernardino Montaña de Monserrate, impreso en Valladolid en casa de S. Martinez año de 1551, fol.; the three muscle-manikins, the arteries, veins, and nerves, two torsi with thoracic and abdominal organs, uterus, brain, and cranial nerves, the front views of the skeleton, are all taken from Vesalius and done in poor woodcuts. Montaña, pp. CXXIXa–CXXXIVb.

Daniel Moeglingus: De humano corpore, Tubingae, 1591, fol.; compilation from Vesalius.

Giuseppe Montani: Anatomia ridotta all' uso di pittori e scultori, consecrata all' ill. ed exc. signore il signor Gio. Andrea Rociborsko, conte di Morstin, Venegia, G. T. Valvasense, 1679, fol.

Franciscus Sanchez: Summa anatomica, in qua breviter omnium corporis partium situs, numerus, substantia, usus et figura continetur, ex Galeno et A. Vesalio collecta. Additae sunt etiam adnotationes, quibus Columbi et Fallopii repugnantia cum Galeno et Vesalio continetur et inter se. Tolos, 1636, fol.; very poor copies after Vesalius.

Haller, I, 180.

Moehsen: *Bildn.*, pp. 80, 149.

Roth (Moritz): *Andreas Vesalius Bruxellensis*, 1892, VIII, 500 pp., 30 pl., 8°, Berlin, G. Reimer.]

BARTOLOMMEO EUSTACHI

Bartolommeo Eustachi, of Sanseverino in the province of Ancona, was actively interested in anatomy, even while physician to the Duke of Urbino. He, later, went to Rome with the Cardinal Guilio della Rovere and there became lecturer on anatomy at the *Studio della Sapienza*, a position which he resigned voluntarily on account of declining age. The illness of the above-named cardinal summoned Eustachius to Fossombrone (*Forum Sempronii*), but he died on the journey thither in August, 1574.

Having a great attachment for Galenic anatomy and defending it most vigorously against newer investigations, particularly those of Vesalian anatomy, Eustachius, more than any other anatomist of his time, enriched his science by exact investigations, which he extended to almost all parts of the human body. Moreover, he utilized animal dissections for pathological research and is said to have been the first anatomist to introduce postmortem examinations in Roman hospitals.

His illustrations are dry and hard and show little artistic treatment. As modes of anatomic representation, they are exact and instructive and all are copper engravings. Instead of printing letters on the figures, which he everywhere avoids, Eustachius introduced graduated margins (similar to the margins of maps) which made possible the finding of any parts and their names by means of a ruler. Some of the editions even furnished the ruler.

The illustrations were probably drawn by Eustachius himself and his relative and assistant, Pier Matteo Pini of Urbino, and were engraved by Giulio de' Musi of Rome. Of the latter, however, only architectural prints are known, apart from these engravings; this may account for the fact that the engravings are lifeless and stiff and not at all adequate representations of living parts. Our authority is the preface to Gaëtano Petrioli's *Discorso anatomico osia universal commento nelle tavole del B. Eustachio*. Roma, 1742, fol., where we read, *tutte le parti, che il corpo umani compongono, in 47 rami grandi descrisse per mano dell' insigne Guilio de Musis Romano*, etc. The plates themselves possess no mark of the artist.

Only eight prints in octavo were published during Eustachius' lifetime. Seven of them pertain to the study of the kidneys, of the azygos

vein, and of the auditory organ. The eighth plate deals with the veins of the arms and the heart. The original can be found in

Bartholomaei Eustachii: Opuscula anatomica. Venet., Vincent. Luchinus excudebat, 1564, 4°.

Poorer copies of the engravings may be seen in the following editions of these *Opuscula*. Lugd. Bat. 1707, 8°, and Delphis, 1726, 8°.

Eustachius died without issue and bequeathed to his relative, the above-mentioned Pini, thirty-eight copperplates which had been completed as early as 1552 (*de renibus praef. et cap. 16*). They were not printed, however, because Eustachius, overtaken by death, had been unable to publish his work *De dissensionibus ac controversiis anatomicis* for which the prints had been intended. In the eighteenth century the papal physician Lancisi found the plates with the heirs of Pini, the family Rossi (de Rubeis), and published them with his own commentaries in 1714. Eustachius' own comments had not been found and have not yet been recovered. To these thirty-eight plates were added the eight plates in octavo mentioned before. One of the folio-plates found by Lancisi was engraved on both sides, thus bringing the number of Eustachius' original engravings up to forty-seven. These forty-seven plates deal with almost all parts of the body and were particularly intended to correct disputed views of the anatomists of Eustachius' time. When Eustachius in his preface to the *Opusc. anat.*, says that he had prepared forty-six copper engravings for the above-named work, he either counted in the eight octavo plates which appeared in the *Opusc.* or, less likely, eight of the larger plates were lost. The following editions are known:

Romae, 1714, fol., ex officina Francisci Gonzagae, 44 and 127 pp. and 47 copperplates.

This was edited by Giovanni Maria Lancisi, under the title: *Tabulae anatomicae Bartholomaei Eustachii, quas e tenebris tandem vindicatas . . . . praefatione, notisque illustravit ac publici juris fecit Jo. Maria Lancisius.* Besides several letters of other anatomists, Eustachius' own elucidation accompanies the first eight plates, while another is given by Lancisi for the thirty-nine other plates. The impressions are taken from the old original plates. A vignette on the title-page represents a dissection. The picture is drawn by Pier Leone Ghezzi and shows a skeleton standing upright on the right-hand side of the illustration. The dissector stands to the left of the cadaver, demonstrating with his right hand and leaning on the dissecting table with his left hand. The picture is not engraved by Ghezzi and bears only this subscription: *Eques Petrus Leo Ghezzius Inu. et delin.*

Amstelaedami, 1722, fol., apud R. et G. Wetstenios, 44 and 127 pp. and 47 copperplates.

The type is new. In the preface, Lancisi's dedication to the pope is omitted; in its place is one to Boerhaave and Albinus and two criticisms by Lorenz Heister. The text agrees page for page with the former edition. The engravings of the illustrations are all copies. The vignette too is a copy but reversed.

Romae, 1728, fol., sumptib. Laur. et Thomae Pagliarini, ex typographia Rochi Bernabo. Editiò Romana altera, 28 and 90 pp. and 47 (anat.) copperplates.

This edition contains impressions from the original plates, reprints of the prefaces, and the text of Lancisi's edition. Ghezzi's original vignette is placed on the title-page. There is added in this edition one page in the text containing comments on Eustachius and one folio copperplate, representing a bust of Cardinal Annibale Albani, drawn by N. Ricciolini and engraved by C. Gregori.

Lugd. Bat. 1744, fol., apud Jo. Arnold. Langerak et Joh. et Hermann Verbeek, e typographia Dammeana, 28 and 280 pp. and 47 double copperplates.

In this edition, each of Eustachius' plates is supplemented by a separate outline plate of equal size on which the explanatory letters are engraved. The Eustachian plates in this edition, too, are newly engraved copies, different from those in the Amsterdam edition. The title is: *Bernardi Siegfried Albini: Explicatio tabularum anatomicarum Barth. Eustachii. Accedit tabularum editio nova.* The explanations of the plates are by Albinus. The text only was in the edition, *Lugd. Bat.* 1762, fol.,

Venet., 1769, fol., cum praefatione et notis Jo. Mar. Lancisii, acc. epistolae Morgagni, etc., with copperplates.

This edition seems to be the Roman edition without any changes. There are very valuable parchment copies still in existence. See Ebert no. 7161. Another edition with copper engravings and commentary is by And. Maximinus, *Romae, 1783, fol.*

Amsterdam, 1798, fol., bij Elwe, with engraved copies of Albinus' plates and Dutch text.

The text is by Andr. Bonn, a professor in Leyden. The plates are re-engraved, but do not compare with those in Albinus' edition, nor with those in the earlier Amsterdam edition. Likewise the outline engravings by Albinus are omitted, as well as the graduated margins which Albinus had preserved. The explanatory letters are placed directly on the engraved figures.

Amsterdam, 1800, fol., bei Elwe und in Comm. bei Röder in Wesel; accompanying text in 8°.

This is a translation of Bonn's edition, made by the Amsterdam physician J. C. Krauss under Bonn's supervision. The eight octavo plates are arranged in groups of four on one page. The engravings are those given by Bonn, and said to have been newly revised and retouched.

The first editor of Eustachius' plates, Lancisi, had probably hurried more in publishing the edition of 1714 than he intended. He, himself, later disapproved of it and authorized the surgeon Gaetano Petrioli of Rome, a vain, conceited individual, to revise it. So, at least Petrioli tells us, after the death of Lancisi (1720). Cardinal Caraffa made him a present of the original plates, which Lancisi had used. Petrioli wrote a number of commentaries, polemic treatises as supplements to Eustachius' plates, which, however, were little valued, or respected by the anatomist. The first one of these was

Riflessioni anatomiche sulle note di Lancisi fatte sopra le tavole del cel. B. Eustachio, etc. *Roma*, 1740, fol., *nella stamperia de Giov. Zempel.*

This contains a bust of Petrioli drawn by de Prenner and engraved by Nolli. The forty-seven plates by Eustachius are sometimes, not always, added to this work. Therefore an edition of Eustachius' plates, *Rom. 1740, fol.*, is mentioned which is nothing more than this edition of the *Riflessioni*, in which we also find a copy of Lancisi's commentary besides Petrioli's very elaborate and often critical commentary. The best part of it is a short biography of Eustachius by Barnardo Gentili, which is based upon very reliable sources. Ghezzi's vignette is on the title-page of the book. It is engraved by himself although revised, and therefore bears the following signature: *Eques Petrus Leo Ghezzius Inu. del. et scul.* [Regarding the vignette by Leo Ghezzi see Bartsch: *Peint. grav.* XXI, 308, no. 33.]

After he had published several similar works on Eustachius' plates, also a *Corso anatomico* or *Universal commento* on the subject, Petrioli published eight folio plates which, he had always asserted, were the first eight plates which had been missing from Eustachius' collection, and in place of which the octavo plates (kidneys etc.) had been published. Petrioli's eight folio plates were products of his own invention. They are in folio and were drawn by Giovanni Pesci and engraved by Bald. Gabuggiani. They have no anatomic value but the main figures are well drawn and very carefully engraved. These eight folio plates are contained in

Anatomicae tabulae octo, quinquaginta figuris ornatae, quae inter Eustachianas desiderantur, opera et studio Cajetani Petrioli. Rom. 1748, fol., *ex typographia Joann. Zempel,*
and also in

Le otto tavole anatomiche con cinquanta figure in foglio delineate per compimento dell' opera sublime et imperfetta del B. Eustachio, etc. *Roma,* 1750. fol., *nella stamperia di Anton. de' Rossi,*

Both these works have Ghezzi's vignette re-engraved and revised. The engraving of the eight plates by Petrioli was begun in 1740 and each contain one main figure (a whole body) and several accessory figures. Altogether there are on these plates, principal and accessory, only forty-nine figures, not fifty. Each plate is signed: *Orig. di Gaet. Petrioli.* The thirty-nine Eustachian plates are often added to both these works of Petrioli.

In Jean Jacques Manget's *Theatrum anatomicum, Genevae,* 1717, fol. we find reduced and partly incorrect copies of Eustachius' forty-seven plates.

The following passage from Roger's *collection of prints* (in the article on Pier Leone Ghezzi, I, 173):

Our learned Ghezzi had besides a particular inclination to physics, anatomy and botany; in all which sciences he made great proficiency under the direction of the celebrated Giovanni Maria Lancisi, the Pope's chief physician. His knowledge in the parts of the human body he has shewn in the anatomical plates of Bartolommeus Eustachius, which were first published and illustrated by Lancisi, etc.,

led to the belief that Ghezzi (b. 1674–d. 1755) engraved the Eustachian plates in the Amsterdam edition. But the technique is quite different from that of Ghezzi. Roger evidently refers to the Lancisi edition of Eustachius' original plates, the figures of which it is chronologically impossible for Ghezzi to have engraved. There seems to have been some confusion with the foregoing vignette on the title-page of the Lancisi edition, which indeed was designed and drawn by Ghezzi, but not engraved by him.

The Scotch physician George Martine (d. 1750) gave a good commentary to Eustachius' plates which was published after his death under the title: *G. Martini in B. Eustachii tabulas anatomicas commentaria,* Edinburgh, *1755, 8°.* Its point of view is historical in the main.

Haller: I, 223.
Ebert, no. 7160–62.
Weigel, no. 8596.
Bartsch: *Peintr. grav.* (Ghezzi) XXI, 308, No. 33.

JUAN VALVERDE DI HAMUSCO

Juan Valverde di Hamusco, a Spaniard from the kingdom of Leon, studied anatomy in Padua and Rome under Realdo Columbo and Bartolommeo Eustachi. He published a manual of anatomy in Spanish, without having done much dissecting. His book was translated into Italian and Latin and parts of it into Dutch. Although he himself says that he merely copied Vesalian figures, we nevertheless find several figures which do not occur in Vesalius' works, e.g., a muscle-manikin holding his skin in his right hand and a dagger in his left; several representations of the abdominal muscles, of the omentum and the intestines; a standing pregnant woman with her abdomen cut open, and representations of the principal veins and many others. Parts of the bodies are dressed in armor. The copies of Vesalian reproductions often show changes. The Spanish painter Gaspar Becerra, born in Baeza in 1520 and known as the maker of small anatomic plaster figures, has been mentioned as the artist who drew the illustrations. The Lorrainer Nicolas Beatrizet or Beautrizet, Niccolo Beatrici (born at Thionville), is supposed to be the engraver, several plates bearing the monogram *N.B*, for example, the fourth and fifth myologic plates and the bust of the author. The editions of this work are as follows:

Roma, 1556, fol., impressa por Antonio Salamanca y Antonio Lafrerij, En Roma. Text, *42* copperplates, and title-page engraving.

On the engraving of the title-page we read: *Historia de la composicion del cuorpo humano escrita por Joan de Valuerde de Hamusco.* This is the first edition of the text and the copperplates. It is dedicated to the Cardinal Archbishop Juan de Toleto who seems to have been the patron of the work. The rich composition of the title-page is different from those of the later editions but is also engraved by Niccolo Beatrici. The engravings, it seems, were also sold without the text.

Roma, 1560, fol., per Anton. Salamanca et Anton. Lafrerj; colophon: *Vinegia appresso Nicolò Bevilacqua Trentino, 17* and *154* leaves, including *42* copperplates.

This is an Italian translation made by Anton Tabo (not Sabo) and revised by the author. It is dedicated to King Philip of Spain. The title is: *Anatomia del corpo humano composta per M. Giovan Valverde di Hamusco e da luy con multe figure di rame et eruditi discorsi in luce*

mandata. The title is a reversed copper engraving and a copy of the one which precedes the Vesalian plates, as published by Jansson (*Amstel.* 1617). The forty-two anatomic copper engravings in folio are included in the number of pages given above. There are a few small woodcuts on the margins of the text. The plates which are not Vesalian are as follows: Lib. II. Tab. 1, L. III. Tab. 1–3, 6, L. VI. Tab. 1. They are, owing to the accessories and the position of the cadaver, ugly and repulsive. The other plates are copied on a reduced scale and sometimes with added alterations, from the plates in Vesalius' principal work *De corporis humani fabrica.* The engraving is done very carefully and precisely, yet without giving to the different parts such natural appearances and lifelike freshness as Vesalius was able to produce in his woodcuts. [Another edition of Anton Tabo's Italian translation of Valverde was published *Vinetia,* 1586, fol., *nella stamperia de Giunti,* under the title: *La anatomia del corpo umano. Nuov. ristampata e amplicata.* It contains four new myologic plates. As regards this edition and the painter Beatrici see Bartsch: *Peint. grav.* XV, pp. 242, 263.]

Antverpiae, 1566, fol., ex officina Christophori Plantini, 153 and 46 pp. including *42* copperplates.

This is a Latin translation of Valverde's explanations of his plates. The other parts of the text are left out. The title is: *Vivae imagines partium corporis humani aereis formis expressae.* Appended is the text of Vesalius' *Epitome,* without the illustration and with a special signature, and also the text from Grevin's edition of Vesalian plates. Valverde's copperplates are all newly engraved, but less beautifully done. The same plates newly engraved with the same Latin text are again published in *Antverp., ex officina Christophori Plantini,* 1568, fol., and *ibid.* 1579, fol., 16, *Kal. Maii,* 175 pages of text with 42 engravings.[1] A Dutch translation of the book appeared under the title: *Anatomie, oft levende beelden vande deelen des menschelicken lichaems: Met de verclaringhe van dien, in de Neder-duytsche spraecke. T'Antwerpen, by Christoffel Plantijn, 1568,* fol., *6* and *197* pp. *text with 42 engravings.*[2]

Venetiis, 1589, fol., studio et industria Juntarum, 34 and *340* pp. including *47* copperplates; the colophon bears the date 1588.

This is a Latin translation of the complete text by Valverde, as it appeared in the Italian edition, under the title: *Anatome*

[1] Another Latin edition issued by Plantin, but unknown to Choulant, was that of 1572.

[2] *A Vesalli en Valuerda Anatomie, Ofte Afbeeldinghe van de Deelen des menschelycken lichaems, en derselver Verklaringhe, t'Amstelredam, Cornelis Danckertz,* 1647. A reprint of the edition of 1568, by Plantin, with newly-engraved plates.

corporis humani auctore Joanne Valverdo, Nunc primùm à Michaele Columbo latinè reddita, et Additis nouis aliquot tabulis exornata. Besides the title-page of the Italian edition, which is slightly elaborated in the Latin edition, there are given the forty-two original plates by Valverde and four myologic plates by an unknown artist and engraver. At the end of the prefaces is inserted on a whole page a bust of Valverde with the monogram of Niccolo Beatrici. The four newly added engravings represent four muscle-manikins in different positions, all beautifully and forcefully engraved. A second edition of this Latin translation appeared *Venetiis*, 1607, fol., with new but revised engravings.[1]

Haller: I, 215.

Weigel, no. 4919, 6811.

Stirling, William: *Annals of the artists of Spain*, London, 1848, 8°, I, 242 *et seq.* (concerninecerra).

[1] *Idem*, Italian editions, (a) *Vinetia*, 1606, fol., 154 pp., (b) *Vinetia*, N, Pezzana, 1682. 13 and 152 pp.

VOLCHER COITER

Volcher Coiter, Coeiter, Koiter, Koyter, born at Gröningen in 1534 and died in 1576 or 1600. He was a pupil of Fallopius, later became city physician at Nuremburg and afterward a French army surgeon. His works are rare and important for the developmental history of the human fetus and the child, also for zoötomy. There should be mentioned:

De ossibus et cartilaginibus corporis humani tabulae, Bonon., apud Joh. Rossium, 1566, fol.

This work is only a tabular compilation without illustrations. In the copy examined by Choulant, five copper engravings, viz., the skeleton of an ape and the four plates with skeletons of other animals, which we shall have occasion to mention farther on, are added to the text without being referred to in the work itself. The author in this copy calls himself Coeiter.

Externarum et internarum principalium humani corporis partium tabulae—autore Volchero Coiter Frisio Groeningensi, Noribergae, in officina Theodori Gerlatzeni, 1573, fol., 14 and 134 pp.

This book is composed of separate treatises, in which only a few illustrations (copper engravings) occur. There are two life-sized engravings of the base of the skull viewed from the upper and the lower surfaces and two engravings of skeletons copied after Vesalius, belonging to *Tabulae ossium hum. corp.;* the skeleton and the skull of a child, on three charts belonging to *De foetus humani et infantium ossibus;* the skeleton of an ape belonging to *Analogia ossium simiae.*

Lectiones Gabrielis Fallopii de partibus similaribus humani corporis—a Volchero Coiter—collectae. His accessere diversorum animalium sceletorum explicationes iconibus artificiosis et genuinis illustratae, Noribergae, in officina Theodorici Gerlachii, 1575, fol., 37 unnumbered leaves. This contains four plates of skeletons of mammals, amphibia (frog and turtle), and birds.

All the illustrations are drawn by Coiter himself as indicated by the letters V. C. D. The engravings are neat and anatomically exact. The four plates last mentioned especially, are freely and truthfully executed.

[The Nuremburg edition of the *Externarum et internarum principalium partium humani corporis tabulae* had been published before the *Noribergae*

in off. Theodori Gerlatzeni 1572, and was given the quoted new title in 1573. The text is the same. The *Tabulae de ossib. et cartilaginib.*, published in 1566, are here given again. In the *Lectiones Gabrielis Fallopii*, on tab. III. the figure of the monstrous fowl has the inscription: 15. G. P. D. 73 which stands for: *Georg Palm, Doctor (med.)* 1573. The *Sceletorum explicationes* are Coiter's own work. The illustrations of the animal skeletons are used again in Johann Andreas Schenck's German translation of Realdus Columbus' *Anatomio*, Frankfort, on the Mayn, 1609, fol. Cf. *Weigel: Kunstkatalog*, no. 18248, 49, 54.]

Coiter bequeathed an anatomic statuette to the city of Nuremburg, which was placed in the public library. Of this Professor Johann Jacobus Baier of Altorf has said:

Felicissime repraesentavit in exili quidem sed artificiossissima statua musculorum situm, venarum vias, ossium divortia, membrorum vincula ita ad viventis naturam exprimente, ut artificem in ea omnem excussisse artem dixerint periti spectatores. (Adagia medicinalia, Franc. et Lips. 1718, 4°, p. 44.)

"He has most faithfully represented in a small but scientifically constructed effigy, the origin and insertion of the muscles, the course of the veins, the articulations of the bones, and the ligaments of the limbs in so lifelike a manner that experts who have viewed it said that in this statue the artist has proved superior to art itself."

Haller: I, 234.

JAN WAUTERS VAN VIERINGEN

Jan Wauters van Vieringen, Valterius Viringus, born in Louvain, was professor there and edited:

Dat Epitome oft cort begryp der Anatomien Andr. Vesalii, uyt het latyn in Nederduudsch overghestelt, Brugghe, 1569, 4°.[1]

Tabula isagogica ossium corporis humani connexionem ac numerum complectens, olim Lovanii edita, nunc recognita et aucta. Duaci, ap. B. Bellerum, 1597, fol. pat.

It is doubtful whether both works have illustrations since *tabula* may mean either an engraving or a tabulation.

Broeckx: *Essai sur l'histoire de la médecine Belge*, Gand, 1837, 8°, p. 319.
Haller: I, 171, 280.

[1] The work contains, besides a portrait of Jan Wauters (Ioan Valterius Viringius), an illustration of anatomic instruments after Vesalius. Haeser and Israels give 1560 in place of 1569. The work is rare. A copy is in the library of the University of Ghent. De Feyfer, *loc. cit.*, 457.

GUIDO GUIDI

Guido Guidi, Vidus Vidius, was born in Florence. His mother Constance was the daughter of the painter Domenico del Ghirlandajo. In 1542, he was called to Paris by Francis I, and after 1548 again lived in Florence. He later became professor in Pisa, and died there on May 26, 1569, after he had taken holy orders. Most of his works were published long after his death, with the exception of his *Chirurgia*. Nevertheless he was highly respected by his contemporaries and especially by Francis I and Cosimo I. He also enjoyed the esteem and friendship of the Florentine goldsmith Benvenuto Cellini with whom he lived in Paris.

[The woodcuts in *Vidi Vidii: Chirurgia*, Paris, 1544, fol., show excellent workmanship and are very numerous. They may probably be attributed to François Jollat who was working in Paris from 1502 to 1550; cf. Weigel: *Kunstkatalog*, no. 20855a. The work is in the library of the Surgical Medical Academy of Dresden.] Cellini has said of him (*Vita*, ed. Lips. 1833, 12°, II, 100, *et seq.*):

Sebbene molto prima io mi dovevo ricordare della guadagnata amicizia del piu virtuoso, del piu amorevole e del piu domestico uomo dabbene, che mai io conoscesis al mondo; questo si fu Messer Guido Guidi, eccellente medico e Dottore, e nobile cittadin fiorontino. . . . . Capitò il detto Messer Guido in Parigi, e avendolo cominciato a conoscere lo menai al mio castello (Piccol Nello, Petit-Nesle), e quivi gli detti una stanza libera da per se: cosi ci godemmo insieme parecchi anni. . . . . Con il sopradetto Messer Guido godemmo l'amicizia tanti anni, quanto io la soprastetti, gloriandoci spesso insieme, che noi imparavano qualche virtu alle spese di quello cosi grande e maraviglioso Principe (Francis I), ognun di noi in nella sua professione. . . . . Aveva in questo mio castello un giuoco di palla . . . ., era in detto luogo alcune piccole istanzette, dove abitava diversa sorte d'uomini, infra i quali era uno stampatore, molto valente, di libri: questo teneva quasi tutta la sua bottega drento in nel mio castello, e fù quello che stampo quel primo bel libro di Medicina a Messer Guido.

"Far back in my autobiography I ought to have recorded the friendship which I won with the most cultivated, the most affectionate, and the most companionable man of worth I ever knew in this world. He was Messer Guido Guidi, an able physician and doctor of medicine, and a nobleman of Florence. . . . . Messer Guido came to Paris; and not long after making his acquaintance, I took him to my castle, and there assigned him his own suite of apartments. We enjoyed our lives together in that place for several years. . . . . We enjoyed our mutual friendship during all the years I stayed in Paris, and often did we exult together on being able to advance

in art and knowledge at the cost of that so great and admirable prince, our patron, each in his own branch of industry. . . . . I had a tennis-court in my castle, from which I drew considerable profit. The building also contained some little dwellings inhabited by different sorts of men, among whom was a printer of books of much excellence in his own trade. Nearly the whole of his premises lay inside the castle, and he was the man who printed Messer Guido's first fine book on medicine." (The Life of Benvenuto Cellini, translated by John Addington Symonds.)

This book printed in Petit-Nesle, is the *Chirurgia e graeco in latinum conversa, Vido Vidio Florentino interprete, Lutetiae Parisiorum, excudebat Petrus Galterius*, 1544, *pridie Cal. Maii, fol.*

The complete anatomic work which Guido left was also not published until long after his death, and when, at last, it appeared it hardly received the attention that it deserved, and is now rarely seen. It is known under the following title:

Vidi Vidii: Florentini de anatome corporis humani libri VII. Nunc primum in lucem editi atque LXXVIII. tabulis in aes incisis illustrati et exornati. Francofurti, typis et sumptibus Wechelianorum apud Danielem et David. Aubrios et Clementem Schleichium, 1626, fol., copper title-page, 323 pp., including a plate representing the anatomist's armamentarium and 78 anatomic copperplates in folio.

This work first appeared as the third volume of the *Ars medicinalis, Venet. apud Juntas*, 1611, fol., a book edited by the younger Vidus Vidius and containing the collected works of our author. The plates are mostly new and original. They remind one more of Eustachius than of Vesalius. Neither the artist nor the engraver are mentioned anywhere.

Haller: I, 236.

JACQUES GUILLEMEAU

Jacques Guillemeau, born in Orleans, was royal body physician and died in 1612. He is better known in surgery and obstetrics than in anatomy. On the latter he published,

Six tables anatomiques. Paris, chez Jean Charron, 1571, fol.

Michel de St. Pierre, body surgeon of the duke of Lorraine, was a collaborator in this work. The plates represent (1) the bones, (2) the abdominal cavity, (3) the thoracic cavity, (4) the head, (5) the arteries, veins, and nerves, (6) the muscles.

He also published

Tables anatomiques avec les pourtraicts et déclaration d'Iceulx, ensemble Vn denombrement de Cinq Cens Maladies diuerses. (Also with title: *Anatomie universelle du corps humain en tables methodiques*, etc.) *Paris, chez Jean Charron*, 1586, fol. Reprinted Paris, 1598, fol.

On the copper-title we see the coat-of-arms of Henry III, and the four elements and temperaments. The title-page is followed by nineteen anatomic copperplates in folio, most of which show representations after Vesalius and Valverde. The printed text throughout the book is given in tabular form.[1]

Haller: I, 258.

[1] *Idem*, Dutch translation by C. Battum, Dordrecht, 1598, 1606, 1652, 1666.

COSTANZO VAROLIO

Costanzo Varolio, born in Bologna in 1543, became professor of anatomy there and later papal physician. He died in Rome in 1575 or 1578. He was the first to examine the brain from its base up, in contrast with previous dissections from the top down. He gave the name *pons cerebelli* to the *pons* which, indeed, even today is called the bridge of Varolius. Varolius' work is the following:

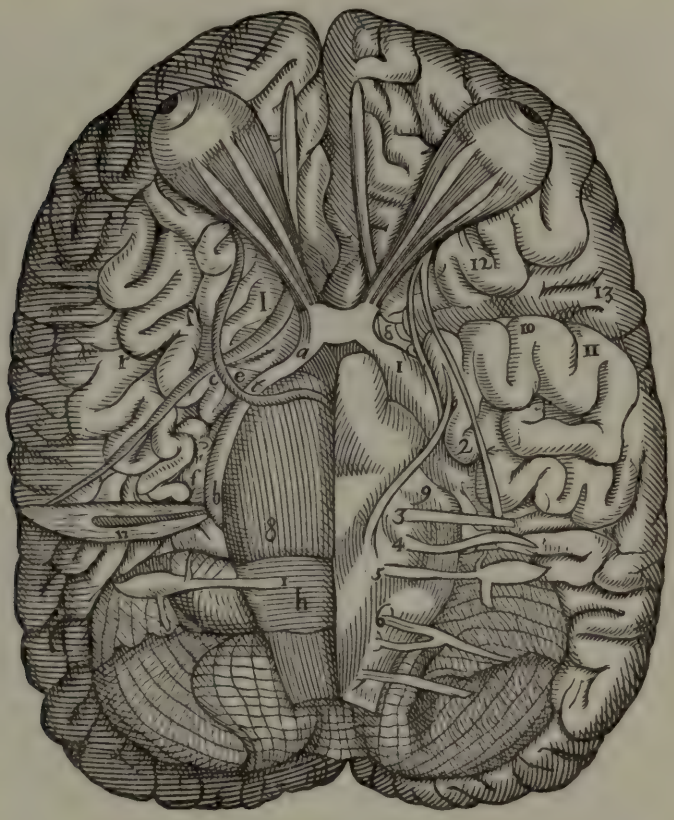
De Nervis Opticis nonnullisque aliis praeter communem opinionem in Humano capite observatis. Ad Hieronymum Mercurialem, Patavii apud Paul. et Anton. Meiettos fratres, 1573, 8°, 8 and 32 leaves.

It consists of a letter to Mercurialis, dated April 1, 1572, his answer, and Varolius' reply to the latter. It was published without Varolius' knowledge, his approval being taken for granted. Appended are three woodcuts pertaining to the brain and drawn by Varolius himself. The engraving is somewhat crude, yet distinct and instructive. We find a few very small figures on the margin of the text. Varolius gives the following explanation of the illustration here appended. The left side of the brain is marked with numbers, the right side with letters. Some of the letters, however, were quite indistinct, even on the original woodcut.

1. Origo nervis opticis communiter ascripta. *2.* Origo nervorum, qui petunt musculos oculorum, secundum communem aliorum sententiam. *3–7.* Nervi omnes, quorum originem inquit Vesalius esse ex principio spinalis medullae. *8.* Locus unde instrumenta olfactus ducunt suum principium iuxta communem opinionem. *9.* Principium spinalis medullae reliquis Anatomicis cognitum. *10. 11.* Prominentia media cerebri. *12. 13.* Confinia prominentiae anterioris et supremae cerebri cum media, quas prominentias crediderunt alii esse sibimet continuas in angulo formato inter *10, 11.* et *12. 13.*, ubi revera sunt tantum contiguae, ut patet in dextra parte figurae. *a. b.* Tota portio nervorum opticorum caeteris Anatomicis ignota et ubi *b.* est reflexio praedicti nervi in posteriori parte spinalis medullae. *c. d.* Pars secundi partis nervorum, quam non observarunt alii, et *d.* primum ortum eiusdem nervi. *e. f.* Primus spinalis medullae ex cerebro ortus. Totum autem id, quod est inter *e. f.* et *g.* fuit reliquis dissectoribus occultum. *h.* Processus transversalis cerebri, qui dicitur Pons. *i.* Origo nervi auditus ex ponte cerebelli. *k. l.* Ductus instrumenti olfactus latitans inter supremam et mediam cerebri prominentiam, et ubi *k.* ibi est prima eiusdem instrumenti origo. *m.* Media cerebri prominentia a reliquo cerebro dissecta. *n.* Principium posterioris prominentiae cerebri, unde dissecta fuit media. *o. p.* Cavitas ventriculi, quae reflectitur ad prominentiam mediam. *q. r. s.* Pars superioris prominentiae cerebri, cui media adhaeret contigua. *t.* Intercussatio, quam facit nervus opticus cum nervo musculos oculi petente.

A second work by Varolius, a teleologic physiology of man, was published for the first time after his death:

Anatomiae sive de resolutione corporis humani ad Caesarem Mediovillanum libri IV. Eiusdem Varolii et Hieron. Mercurialis De nervis



Opticis, etc. *epistolae, Francofurti, apud Joh. Wechelum et Petr. Fischerum consortes*, 1591, 8°, 8 and 184 pp.

This contains no illustrations. But the former book is republished as a part of this work with unchanged text and the woodcuts recarved in a somewhat different manner. The drawings are not exact but rather arbitrary reproductions of the original woodcuts.

Haller: I, 241.

FELIX PLATER

Felix Plater was born in Basel in 1536, of a family whose original name was Platter from the house on the "Platte," a rock near the village Grenchen in the parish Visp in Valais. From 1560 he was professor of medicine in Basel, and as a scientist he was particularly interested in anatomy and practical medicine. He died in Basel on July 24, 1614. He published:

De corporis humani structura et usu libri III, tabulis methodice explicati, iconibus accurate illustrati. Basil., ex officina Frobeniana, per Ambrosium Frobenium, 1583, fol.; *ibid.*, 1603, fol.

The second edition was probably in no way different, except that it had a new title (*apud Ludov. König*). The dedication which serves as a preface is the old one of February 1, 1503. The third book had a separate title: *Liber tertius, corporis humani partium per icones delineatarum explicatio, Basil.*, 1603, fol. and contains fifty etched copperplates, with a page of text for each. The engravings are drawn in a free and spirited manner. The bones and the muscles are the best after the manner of the contemporaneous Swiss painters, Christoph Maurer and Tobias Stimmer. The etching was done perhaps by Abel Stimmer. In the book itself no suggestion as to the artist is made, nor can we find anything about the artist in the author's autobiography published by Fechter. The illustrations are chiefly after Vesalius. One plate is after Coiter, but none of Valverde's figures have been copied, inasmuch as the plate of the cutaneous veins (Plate 50), which shows at least some resemblance to one of Valverde's plates, represents the body in a different position. Haller thinks that some of the figures are the results of Plater's personal investigations.

Thomas Platter und Felix Platter: Zwei Autobiographieen. Ein Beitrag zur Sittengeschichte des XVI. Jahrhunderts, herausgegeben von D. A. Fechter, Basel, 1840, 8°.

Weigel: no. 12865.

SALOMON ALBERTI

Salomon Alberti was born in Naumburg on the Saale in 1540, and came to Nuremberg with his parents a few weeks after his birth. He was professor in Wittenberg and electoral body physician from 1592 until his death in Dresden in 1600. He was recognized as an industrious anatomist and an independent investigator. He published:

Historia plerarumque partium humani corporis, in usum tyronum edita. Vitebergae, 1583, 8°; *ibid.*, 1585, 8°; enlarged, *ibid.*, 1601, 8°; and unchanged from this edition, *Viteb*, 1602, 1630, 8°.

The book contains about thirty most peculiar illustrations, large and small, in rather crude woodcuts.

Moehsen: *Beschreibung einer berlinischen Medaillensammlung.* Part I, p. 25, in which a medal struck in his honor is reproduced and certain details of his life are given.

Haller: I, 251.

JUAN DE ARPHE Y VILLAFAÑE

Juan de Arphe y Villafañe, Darphe or Arfe, was the descendant of a German family of artists who came to Spain at the time of Juan's grandfather, Henrique Arfe. The family is particularly famous for artistic gold and silver-work.

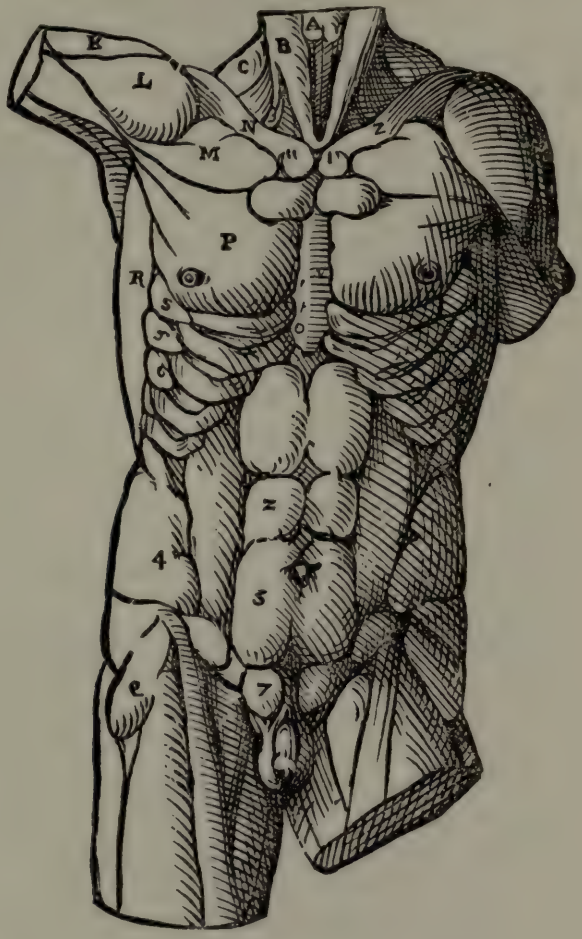
Juan was born in Leon in 1535 and received instruction in the graphic (and plastic) arts from his father Antonio. He studied anatomy in Salamanca and Toledo, at the former city under Cosme de Medina. In Toledo he attempted to establish the proportions of the human body, following in this the examples of Alonso Berreguette and Felipe de Vigarny (Fel. de Borgona). After his father's death he went to live in Valladolid. While in Valladolid he made artistic vessels (receptacles for the host, so-called custodiae or monstrances) of precious metals for the cathedrals in Avila, Sevilla, Burgos, and Valladolid, and the churches in Osma, and St. Martin in Madrid. He also engraved plates in wood and lead, was a sculptor and architect, and was appointed *Ensayador* (assayer) of the mint in Segovia. He later moved to Madrid and died there in the beginning of the seventeenth century.

Juan also made literary attempts, but for our purposes only the following book has any importance:

Varia conmensuracion para la escultura y arquitectura. Sevilla, 1585, fol.—*Madrid, por Francisco Sanz, impressor del Reyno, a costa de la viuda de Bernardo Sierra*, 1675, fol., with woodcuts, Madrid, 1795, fol.; is the 7 edition with re-engraved original plates and additions by Pedro Enguera.—Madrid, 1806. fol., *corregida y aumentada por Josef Assensio y Torres, 2 Vols.*, completely revised, ed. 8, in which the eight-line stanzas are lacking.

The work consists of four books, each one paged independently, at least in the older editions. The first book is on geometry and contains also a rather exhaustive treatise on gnomonics. The second book deals with the proportions of the human body. The third book treats of the quadrupeds and birds and contains a large number of illustrations of animals. The fourth book is on architecture. All four books contain a great many woodcuts which are either printed between the text or cover whole pages. A picture of the author at the age of fifty is in a medallion on the title-page. Besides the explanations in the text a

great number of eight-line stanzas serve to express the scientific precepts. For our purpose only the second book is important. This contains a large number of woodcuts representing outlines of the whole body or of single parts with the measurements. It is quite noticeable that the artist who made the drawings was familiar with Dürer's



figures on proportion, yet the drawings are more truthful, more lifelike, and cleverer. We also find completed and crosshatched drawings for osteology and myology. The latter are the better plates. Pages 24 and 25 represent two skeletons, pages 37 and 38 two male figures; the former has the monogram R in the accessory drawing. This monogram does not occur anywhere else. The two female figures on page 39 are

only outline drawings. Ten face lengths are indicated as composing the height of the body. Two stanzas specify the following requirements as essential for a beautiful female body:

Frente espaciosa, y bien proporcionada, Ojos distantes, grandes, y rasgados, Nariz, que ni sea roma, ni afilada, Los labios no muy gruessos, ni apretados, Boca, que con descuido estè cerrada, Los carrillos redondos, bien formados, Pechos, que disten, con pequeña altura, Hazen una perfecta hermosura, Sean diez rostros de su cuerpo el cuento, Y muestre carnes morvidas, y tiernas; Tenga suave, y blando el movimiento, Y con caderas anchas, gordas piernas: Sea redondo el braço al nacimiento, Cuello liso, sin hoyos, ni cavernas, Pies, y manos pequeños, y carnosos, Que tales cuerpos son los muy hermosos.

"Forehead lofty and well proportioned, eyes widely separated, large and piercing, nose neither Roman nor too pointed, lips not very thick nor tightly pressed, mouth scarcely closed, cheeks rounded and well formed, breasts not too prominent, and at the proper distance from each other, these make a perfect beauty.—There may be ten features in her body: it should display flesh tender and fresh; her movement should be smooth and even, and with wide hips and fat legs, arms rounded at the shoulder, neck smooth without hollows or wrinkles, feet and hands small and plump, such bodies are the most beautiful."

Two male figures are treated in the same way on page 13, their height is also ten face lengths. The proportions of the child are given on page 40.

Arphe belongs to those Spanish artists who spent much time on an earnest study of anatomy, as Alonso Berreguette (1480–1561) and Gaspar Becerra (1520–70). See also article on Valverde. They were particularly interested in the study of the proportions of the human body and also made use of Albrecht Dürer's (1471–1528) work on proportions, of which there is said to exist a Portuguese translation, in manuscript, from the Italian. The author of this translation, Luiz da Costa (b. 1599), probably used an Italian edition of Dürer's work. Besides the men named above there were Felipe de Borgona (Felipe de Vigarny) and the Neapolitan sculptor Pomponio Gaurico who were equally interested along the same lines. The views of these men on the subject differed, and it seemed hardly possible for them to come to any agreement. This must have led Arphe to the writing of the following stanzas which we find among the historical notes of his book on proportions (Book II, page 2):

Despues vino à alterarse esta medida, Porque à Pomponio Gaurico, y Durero Les pareciò que andava muy crecida, Y acortaron en ella un rostro entero: Pero duròle poco esta caida: Y luego si reduxo al ser primero Por Polavolo, Bacho y Rafael, Manteña, Donatelo y Micael.—Traspusose despues en esta tierra Por dos famosos della naturales, El uno Berruguete, otro Bezerra, Ambos en escultura principales: Con la opinion contraria hizieron guerra, Dando siempre à entender que no eran tales Las partes y medida que acà usavan, Como la que traxeron y enseñavan.

"Later this standard of beauty was altered, because Pomonio Gaurico and Dürer thought the height too great, and they shortened the stature by the length of an entire face, but this change lasted for a short time only and was abolished in favor of the original standard by Pollaiuolo, Baccio Baldini, Raphael, Mantegna, Donatello, and Michelangelo. Afterwards it was changed back by two famous naturalists, Berreguette and Bezerra, both noted in sculpture. With the contrary standard they waged war, giving all to understand that these standards were not the ones made use of or taught by them."

In the text Bacho is explained to stand for Baccio Baldini and Micael for Buonnaroti; the other names require no explanation.

See also:

Bermudez (Juan Agustin Cean): *Diccionario historico de los mas ilustres profesores de las bellas artes en España*, Madrid, 1800, 8°, pp. 59, 107, 130, etc.

Fiorillo (Johann Dominik): *Geschichte der zeichnenden Künste von iher Wiederauflebung bis auf die neuesten Zeiten*, IV, 74, 106, 150.

Stirling (William): *Annals of the Artists of Spain*, London, 1848, 8°, I, 392 *et seq.*

ARCHANGELO PICCOLHOMINI

Archangelo Piccolhomini, of Ferrara, wrote a manual of anatomy with illustrations under the title:

Anatomicae praelectiones explicantes mirificam corporis humani fabricam, Romae, ex typographia Barthol. Bonfadini, 1586, fol.

He himself never did much dissecting, and his book contains only very poor and few truthful representations. We find woodcuts of the abdominal muscles and the heart printed in between the text on pages 68–71 and 207. Haller (I, 260) rightly calls them badly and arbitrarily done (*ex arbitrio fictas*).

In the article on Remmelin the *Anatome integra revisa. Veronae*, 1754, fol., will be spoken of which appeared over his name, but was the fraudulent work of a book-dealer.

ANDRÉ DU LAURENS

André du Laurens, Andreas Laurentius, of Arles, was professor in Montpellier in 1586. From 1600 he was royal physician at the court in Paris and died there in 1609. His activity as an anatomist was limited. He seems to have been too fond of court life. Nevertheless, his work

Historia anatomica humani corporis et singularum eius partium, multis controversiis et observationibus novis illustrata, Paris, 1589, fol., went through several editions: *Paris, 1600, fol.; Francofurti, apud Matth. Beckerum, impensis Theodorici de Bry viduae, s. a. fol.* and oftener; *Francof., 1602, 8°*, without illustrations; *Ludg., 1605, 8°*, also without illustrations. It is also republished in the latter's *Opera, Francof. (Paris), 1627, fol.* and in a French translation in the same author's *Œuvres, traduittes par Theoph. Gelée, Paris, 1621, fol.* where a copper-title engraved by Charles de Malleri accompanies it.

The illustrations are distributed over twenty-six folio copper-prints and are, in the main, copies from Vesalius, Coiter, Valverde, and others. They have no particular anatomic or artistic value. On the copper-title is a bust of Du Laurens; preceding the dedication is a bust of Henry IV of France. The anatomic plates were also published separately with an explanation in French:[1] *Paris, 1741, 1781, fol.*

Astruc: *Mémoires pour servir à l'historie de la Faculté de médecine de Montpellier*, Paris, 1767, V, 247.

Haller: I, 270.

[1] This edition was published under the title: *Anatomie universelle de toutes les parties du corps humain, representée en figures et exactement expliquée par . . . . , Paris, 1731; 1748.*

GIULIO CASSERIO

Giulio Casserio, Casserius, of Piacenza, Julius Casserius Placentinus, was born in 1561 and died in 1616. He was a pupil of Fabricius ab Aquapendente, and, from 1604, his successor as professor of anatomy in Padua.

Casserius rendered particular services to the science of the anatomy of the vocal and the auditory organs as well as to the anatomy of the other sense organs. The results of his studies are to a large extent based on zoötomic researches.

De vocis auditusque organis historia anatomica—variis iconibus aere excusis illustrata, Ferrariae, (1601) *large fol. excudebat Victorius Baldinus, sumptib. unitorum Patavii,* with 37 copperplates in folio.

There are thirty-seven copperplates. The first one is the copper-title, the second one a bust of the duke Ranutio Farnese of Parma, and the third one a bust of Casserius himself. The other plates are anatomic representations, twenty-two dealing with the vocal organs, and twelve with the ear. Among them we find a great many zoötomic representations. Plate 21 represents the vocal organs of the cicadas, the grasshopper, and similar insects. The artists who made the drawings and did the engravings are not mentioned on the plates, but we are led to conclude from a passage in the *Tractat. de auris auditusque organo, lib. I. cap. 13, pag. 79* that the painter and etcher Joseph Maurer, a German who lived in Casserius' house at Casserius' expense, did both the drawing and the engraving of the illustrations, for Casserius says in the cited passage:

> (Musculum hunc) ego anno 1593 mense Martio, die septimo—observavi, statim ab honorabili Viro Josepho Murero Germano Pictore, tunc temporis mihi pro pingendis figuris anatomicis cohabitanti, delineari in perpetuam memoriam curavi.
>
> "I observed this muscle in the year 1593, on the seventh of March, and immediately had it drawn for everlasting memory by that distinguished man Joseph Maurer, the German, artist, who was at that time living in my household for the purpose of painting anatomic illustrations."

He has also been called Josias Maurer. Both the drawing and engraving are done with unusual care and are anatomically exact. The work consists of two treatises: the first (printed in 1601) on the vocal organs and the second (printed in 1600) on the auditory organs. The complete

work, then, cannot have been published in 1600, but in 1601. The year of publication is not given on the title.

Pentaestheseion hoc est de quinque sensibus liber, Venet., 1609, fol., *apud Nicol. Misserinum*, with 33 copperplates and a copper-title.—New edition: *Nova anatomia continens accuratam organorum sensilium, tam humanorum quam animalium brutorum et delineationem et descriptionem, Francof.*, 1622, small fol. *impensis Joh. Treudel.*

In this work we find again the twelve plates pertaining to the ear. The remaining plates, which deal with the other four sense organs, are new. The original edition is said to have contained a copper-title and thirty-three plates, all from the hands of the artist who drew and engraved the plates of the preceding work. The second edition contains also a copper-title and thirty-three plates, but reduced and certainly executed by another artist. Some of them are even reversed and show much inferior workmanship.

Casserius rendered to anatomic illustration even greater service than through these highly valuable investigations and scientific contributions which are of lasting value, by another work covering the whole field of human anatomy. He did not live to arrange for its publication, and only a part of the illustrations that he had intended for this work, have been preserved to our day. He himself has said of this work:

> De totius humani corporis fabrica imagines in lucem dabo omnibus perfectas numeris et absolutas, quaeque fortasse caeteras omnes, quotquot hactenus prodiere, elegantia, perspicuitate, artificio denique ac studio superent universas (de voc. audit, org. praef.)
>
> "As regards the fabric of the human body, I will make public, pictures finished and complete in every part, which will, I venture to say, excel in nicety, clearness, and finally in workmanship and pains all that have hitherto been published."

and later:

> Ita quoque propediem in tuum commodum et anatomici studii ornamentum Theatrum meum, quod affectum mihi est in manibus, opus omnium partium fabricam, actiones, usus continens cum magna observationum multarum, novarum opinionum et vivarum tabularum varietate edendum curabo (pentaesth. praef.).
>
> "Accordingly I will presently have published, for your benefit and the furthering of the study of anatomy, my Theater (birdseye view), which I have now on hand, a work containing the structure, actions, and uses of all the parts of the body, together with a wealth of observations and a great variety of new ideas and illustrations from life."

This book must therefore, have been begun about 1600 and the author must have been working at it sixteen years when he died. Casserius himself attached great value to this book and considered it his life-work.

When Casserius died in 1616, Adrian van der Spieghel (Spigelius, born in Brussels in 1578) became his successor in the chair of anatomy at Padua. Spieghel died in 1625, and in his will he asked a German physician, Daniel Rindfleisch of Breslau (Bucretius), to publish his posthumous work *De humani corporis fabrica*, a manuscript without any illustrations. [Daniel Bucretius received his doctor's degree in Padua, on June 22, 1626, entered the Dominican Order, under the name of *Joannes a S. Thoma* on April 25, 1629, and died as deacon, September 10, 1631, only thirty-one years old. He must, therefore, have been born about 1600. (Echard et Quetif: *Scriptores ordinis praedicatorum recensiti, Tom. II, 270.*)] Bucretius asked the heirs of Casserius for the plates which Casserius had had drawn and engraved for his *Theatrum anatomicum* intending to add these plates to Spigelius' work. He received seventy-eight plates, but one of them got spoiled or, as an unconfirmed report has it, was purposely ruined by Bucretius because it did not come up to his standard. There therefore remained seventy-seven plates, to which Bucretius added twenty others, drawn and engraved by the same artists who made those of Casserius: Two plates representing front and back views of a male body; ten osteologic plates; one plate representing facial muscles; five plates from Vesalius representing parts of the vascular and nervous systems, and two plates pertaining to the air passages, to sight, and to hearing. The ninety-seven plates were published under the title:

Julii Casserii Placentini Tabulae anatomicae LXXIIX, omnes novae nec antehac visae; Dan. Bucretius XX quae deerant supplevit et omnium explicationes addidit, Venet., 1627, fol., *ap. Evangelistam Deuchinum;* copper-title, 97 anatomical plates, each with a page of explanatory text.

Copies of this work differ. In some we find besides the copper-title, a dedication by Bucretius to the city council of Breslau, dated February 1, 1627; and it has been asserted that in these copies the engravings have not been very carefully printed. Other copies have only the copper-title and in still others the copper title-page is also lacking. In these latter copies the paper used is better and the copper engravings are superior. The name of Odoardo Fialetti, as the artist, and the name of Francesco Valesio, as the engraver, are given on the copper-title.

These plates were also published in the first edition of Spigelius' anatomy under the title:

Adriani Spigelii De humani corporis fabrica libri decem, Venet., 1627, fol., *ap. Evang. Deuchinum.*

This edition contains the text of Spigelius' work and ninety-seven anatomic copperplates. Spigelius' son-in-law, the physician Liberalis Crema of Padua, had bought several other copperplates from Casserius' grandson and when in 1626 he wished to publish a few selections from the posthumous works of his father-in-law, he chose nine appropriate plates and added them with his own explanations to these selections. The following is his publication:

Adriani Spigelii De formato foetu liber singularis aeneis figuris exornatus, epistolae duae anatomicae, tractatus de arthritide, opera posthuma, studio Liberalis Cremae Tarvisini edita, Patavii, apud Joh. Bapt. de Martinis et Livium Pasquatum, s. a. fol., 8 and 104 pp. and 9 copperplates in folio.

The dedication is dated April 26, 1626 (*VI. kal. Maji*). The plates belong to the treatise *de formato foetu* and deal with the pregnant uterus, placenta, and the child. They are among Casserius' most beautiful engravings. Four of them represent entire female figures with the abdomen cut open. At their feet we see decorative landscapes. The work was published at Crema's expense and is rare. Möhsen's statement (*Bildnisse*, page 97) that the edition contained ten copperplates and that Casserius was the author of the treatise *de formato foetu*, is incorrect.

Up to the time when Joannes Antonides van der Linden (1609–64), then professor in Franeker, published Spigelius' complete works including a few smaller and older writings, eighty-six plates from Casserius' legacy and twenty plates added by Bucretius had been published.

Adriani Spigelii Opera, quae extant omnia. Ex recensione Joh. Antonidae van der Linden, Amsterdami, apud Joann. Blaeu, 1645. fol., 2 vols., splendidly printed;

In this work we find in addition to a copper-title and a bust of Spigelius very beautifully engraved by Jeremiah Falck, ninety-seven anatomic plates (i.e., seventy-seven from Casserius' legacy and twenty added by Bucretius), the nine prints belonging to the *Tractat. de formato foetu*, and a tenth one representing the hymen, which also came from Casserius' legacy and had been obtained through the assistance of Johannes Rhodius. There are altogether one hundred and seven anatomic plates dealing with subjects of Spigelius' works. But there are besides these, ten more copperplates which do not belong to the Casserius series. Four of them belong to *Gasparo Aselli: De lactibus et lacteis venis*, one to William Harvey: *De motu cordis et sanguinis*, three to Johannes Walaeus: *De motu chyli*, and two to Adrianus Spigelius: *De lumbrico lato*. All these treatises are also contained in this edition.

This edition of Spigelius' works constitutes the most complete collection of original impressions of the eighty-seven plates from Casserius' legacy and the twenty added to them by Bucretius. These plates were drawn by Odoardo Fialetti (b. Bologna 1573–d. Venice 1638), a pupil of Giovanni Battista Cremonini and of Jacomo Robusti, and were engraved by Francesco Valegio (Valesius). [Odoardo Fialetti

was the author of a manual for the drawing of the human body, with proportional lines: *Il vero modo ed ordine per disegnar tutte le parti e membra del corpo umano, Venez. appresso 'l Sadeler*, 1608, cf. Bartsch: *Peintr. grav.* XVII c. 296.] The names of both masters are given only on the copper-title of Bucretius' edition of 1627, which appears again in the 1645 edition of Spigelius' work, and nowhere else. Only the first two plates added by Bucretius (representing two nude figures), bear on the left-hand side the name of the engraver, Francesco Valesio, but not

the name of the artist. But in Bucretius' preface (1627) both masters are expressly named as the artist and the engraver of all the plates:

Ecce eosdem adhuc in vivis reperio, qui ante plures annos in hoc ipso opere Placentino operam tulissent, Edoardum inquam Fialettum Bononiensem et Franciscum Vallesium Venetum, illum pictorum, hunc gryptarum suae tempestatis et in urbium regina Phoenices.

"Mark you, I find still among the living the very same men who many years ago assisted Placentius in this self-same work, I refer to Edward Fialettus of Bologna and Francis Vallesius of Venice, veritable phoenixes, the one of the painters, the other of the sculptors of his time, in the queen of cities."

Casserius' plates mark a new epoch in the history of anatomic representation, owing to the correctness of their anatomic drawing, their tasteful arrangement, and the beauty of their technical execution. And this all the more, since they cover the whole field of anatomy and have become the models for anatomic illustrations in copper, just as the Vesalian representations had been for anatomic woodcuts. The woodcut was now entirely abandoned. Its means of reproduction had proved insufficient in view of the necessarily more minute representation required at this time.

Under the title: *Julii Casserii Placentini Tabulae anatomicae LXXIIX*, etc. *Francof., impensis et caelo Matthaei Meriani*, 1632, 4°, there are published some re-engraved copies of the plates belonging to Spigelius' work *De humani corporis fabrica*, all reduced to quarto size. Copies of the plates belonging to the treatise *De formato foetu* are not among them. These same copies were re-engraved again and were published with German text under the title: *Julii Casserii Placentini und Danielis Bucretii Anatomische Tafeln*, etc., *mit beygefügtem Unterricht von der Frucht im Mutterleibe. Angeordnet und ausgefertigt von Simon Paulli, Frankfurt, b. G. H. Oehrling*, 1683, 4°; and 1712, 4°. In both editions, we find under a special title reduced copies of the nine plates belonging to *De formato foetu*. The tenth plate is lacking. There is still another edition under whose title we read: *Nebst der Einführung der Anatomey-Kunst auff derer uhralten königlichen Akademien Kopenhagen, Frankfurt am Mayn*, T. M. Götze, 1656, 4°.

Poggiali (Cristoforo): Memorie per la storia letteraria di Piacenza, Piacenza, 1739, 4°, I, II, pp. 91 *et seq.*

Moehsen: *Bildn.* p. 94.

Haller: I, 289, 357.

CASPAR BAUHIN

Caspar Bauhin, professor of anatomy and botany in Basel, was born in 1560 and died in 1624. Of his many writings only the following concern us:

Theatrum anatomicum novis figuris aeneis illustratum et in lucem emissum opera et sumptibus Theodori de Bry relictae viduae et filiorum Joann. Theod. et Joann. Israel de Bry, Francof., 1605, 8°; *ibid.*, 1621, 4°.

Vivae imagines partium corporis humani aeneis formis expressae et ex theatro anatomico C. Bauhini desumptae. Opera sumptibusque Jo. Theod. de Bry (Francof.), 1620, 4°, with 140 copperplates; *ibid., 1640.*

They contain reduced copies from Vesalius, Valverde, Eustachius, Coiter, and other anatomists, but have no particular artistic value. The merit of Bauhin's work consists rather in the compiling and revising of subject-matter already known. He did this in a scholarly fashion and with expert knowledge, and was thus able to produce a work that was both welcome and useful to his time.

Haller: I, 260.
Weigel: no. 17774.

PETER PAUL RUBENS

A plate from a sketchbook edited by Peter Paul Rubens (b. Cologne 1577, d. Antwerp 1640), after a traced copy of an example preserved in the museum in Amsterdam.

The Royal Collection of Copper-Engravings at Dresden also possesses a number of prints from this sketchbook, among them the muscles of the arm, the hand, the foot, and several musclemen, most of them in extreme motion. Then there are prints without anatomy, representing the head, the face, the eye, the ear, the hands, and the feet. The organs represented anatomically are not praiseworthy. The title is written on a stretched-out animal skin, beneath it a filled money bag. The title is: *P. P. Rubens delineavit. Antverp. ap. Alexandr. Voet. Paul. Pontius sculpsit.* It contains twenty plates, among them eight anatomic ones. Cf. F. Basan: *Catalogue des estampes gravées d'après P. P. Rubens*, Paris, 1767, 8°, p. 242; see also the *Index to sketches of Rubens in the Lawrence Gallery edited by J. S. Woodburn*, London, 1835, 8°, p. 17, no. 55.

[*Théorie de la figure humaine, considérée dans ses principes, soit en repos ou en mouvement. Ouvrage trad. du latin, avec xliv planches gravées par*

Pierre Aveline, d'après les desseins, etc. Paris, C.-A. Jombert, 1773. 4°, xi, 55 pp., 44 pl., port.

The work is a translation of certain posthumous fragments of Rubens, the scaffolding for a more definitive treatise on the human figure. The text is sketchy and of trite elementary character. Two chapters, made up of alchemical and astrological reveries, similar to those found in Albrecht Dürer, Cardan and Lomazzo, have been omitted by the translator. The forty-four copperplates by Pierre Aveline, from pen and pencil drawings of Rubens, are the ordinary painter's preliminary studies of the external configuration of the body in various attitudes, with touches of the study of human proportion here and there. The first six plates represent human heads, resembling those of animals, after the manner of Leonardo's grotesques. Muscles in action are studied in plates xvi–xxiv. The series was evidently inspired by the studies of Leonardo and Dürer.]

JOHANN REMMELIN

Johann Remmelin, a physician of Ulm, born in 1583, decided to reproduce the entire anatomy of the human body on three plates in such a manner that parts lying successively one under the other would be shown by means of pictures fastened one to the other like the pages of a book. These pages were published after his drawings, but without his knowledge, under the title:

Catoptron microcosmicum (Ulm?) 1613, fol.

This edition is wrongly ascribed to the Tyrolese Stephen Michael Spacher. Remmelin himself says that friends to whom he had shown the drawings and manuscript published the edition at their own expense and without his knowledge. He himself published a corrected edition of his work under the title:

Johannis Remmelini Catoptrum microcosmicum, suis aere incisis visionibus splendens, cum historia et pinace, de novo prodit. Augustae Vindelicorum, 1619, fol., *typis Dauidis Francki*,

with an allegorical copper-title, on the back of which there is to be found a bust of Remmelin and three plates (*Visiones*) in folio. On the first of these are reproduced a male and a female body together with the trunk of a pregnant woman; on the second, the man; on the third, the woman; all presented anatomically, in the manner mentioned above. The remaining space of each plate is partly taken up with allegories. On the first plate we find at the left: *J. R. inventor, L. K. sculptor*, at the right: *Stephan Michelspacher excudit.* The initials stand for Johann Remmelin and Lucas Kilian, an industrious engraver of Augsburg (1579–1637). From the signature at the right it becomes evident how one might suppose Stephen Michael Spacher to be the publisher, since in the first edition this name probably stood alone on the plate. The anatomic value of the drawings is very slight and even, as a whole, they represent the clumsiest study of anatomy. Judging from the text, it also appears that the book was to serve physico-theological purposes, and was intended for laymen, for whom it contains altogether too much. Nevertheless the book must have won applause, for besides a few other Latin editions (*Ulm.*, 1660, fol., *sumpt. Joh. Görlini* with the same plates), translations were also published.

Kleiner Welt-Spiegel, Das ist: Abbildung Göttlicher Schöpffung am dess Menschen Leib . . . . in die Teutsche Sprach übersetzet Durch M. Joh. Ludov. Remmelinum, med. stud. authoris filium. Gedrucht durch Joh. Schultes, in Verlegung Joh. Görlin, Ulm, 1661, fol.

This was edited by the son of Remmelin, who had died meanwhile. The plates are those of the Latin edition, but Remmelin's picture is missing. The text is translated into German. A reprint is supposed to have been published at *Francof.* 1660, but may have had only a new title.

Pinax microcosmographicus, etc. *Ontleding des Menshelyke Lichaems*, etc. *Uit het Latyn in de Nederlandtse Tale overgeset en konstigh in't licht gebracht, door Justus Danckers, Amsterdam, voor Justus Danckerz*, 1667, fol.

Here the copper-title is absent as well as Remmelin's picture. The plates are copied and on the back of the title are added two anatomic figures and the principal veins after Valverde. The text is in Dutch.[1]

A survey of the microcosm or the anatomy of man and woman—corrected by Clopton Havers, London, 1702, fol.

An English edition and probably with re-engraved plates, four of which are mentioned. The editor was a celebrated English anatomist, noted in other fields. [Discoverer of the Haversian canals.]

The three principal plates of Remmelin's *Catoptrum*, and the many smaller pictures superimposed, totaled before they were cut out and pasted together, five copperplates. These original plates of Remmelin's seem to have fallen into the hands of a Veronese book-dealer who used them for speculation, asserting that he had obtained possession of the plates from the anatomist Piccolhomini, and published them as a posthumous work of Piccolhomini, purporting to be revised by Fantoni, under the following title:

Archangeli Piccolomini Anatome integra, revisa, tabulis explanata et iconibus mirificam humani corporis fabricam, ad ipsum naturae archetypum exprimentibus, cum praefatione et emendatione Joann. Fantoni, Veronae, sumptib. Gabrielis Julii de Ferrariis, 1754, fol.

In this work, the plates reveal themselves as the original ones of Remmelin through the names of *J. R. inventor, L. K. sculptor, Stephan Michelspacher excudit*, which were engraved upon the first of the plates. The anatomist Fantoni whose name is probably misused, like that of Piccolhomini, was born in Turin, 1675, and died there as a professor and royal body-physician in 1758. He should be distinguished from the Bolognese anatomist Fantoni who gave instructions in anatomy in the academy of the Caracci.

[1] De Feyfer, *op. cit.*, 491, 52, gives the following editions: 1615, 1619, Ausburg 1661; Ulm 1639; 1634, Amsterdam 1645; Frankfort 1660.

This manner of anatomic illustration, however, was not tried here for the first time, as we have mentioned several attempts in our section on "Fugitive Sheets" (*fliegende Blätter*, p. 156). Vesalius himself has given some hints of the method in his *Epitome;* an arrangement of this kind is to be found in the library of Louvain. Several works published immediately after his have also the same idea (see the article on Vesalius, p. 169). Similar attempts can be found in Leonhard Thurneisser: *Confirmatio concertationis. Berol.* fol. 1567, and in Georg Bartisch: *Ὀφθαλμωδουλεῖα, das ist, Augendienst, Dresden, gedruckt durch Matthes Stöckel,* 1583, fol., a rare book with many remarkable woodcuts.[1] Even in recent times, this kind of anatomic representation was used by the Englishman Edward William Tuson, in his textbook on the muscles, *Myopolyplasiasmus,* and in his doctrine of the pregnant uterus, *Enkymoplasma,* which were also translated into German, Weimar, 1826–30.

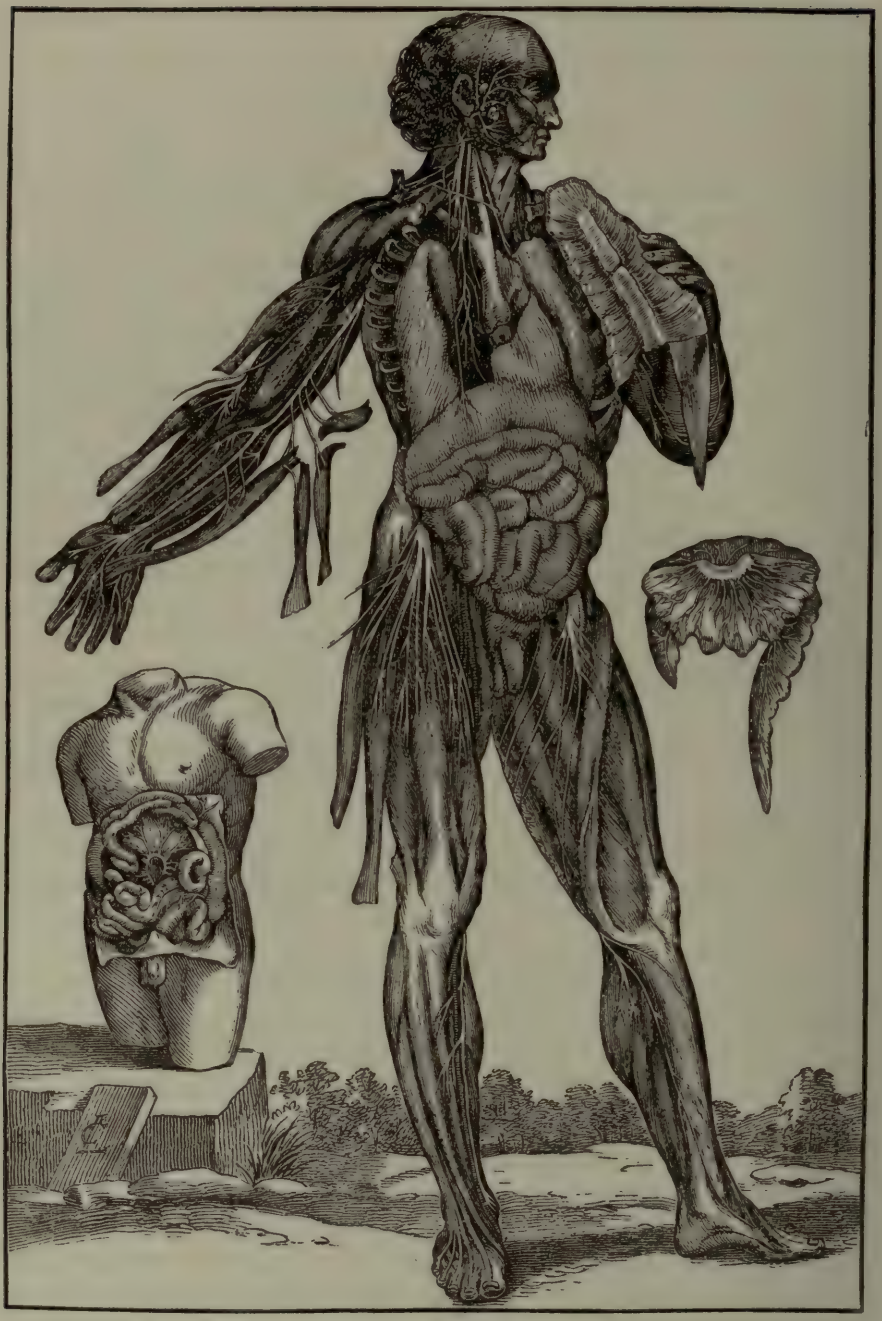
[Ludwig Christoph von Hellwig (1663–1721), an Erfurt professor, edited in German a newly revised edition of Remmelin's *Catoptrum,* enlarged by a few figures from newer anatomists, under the title: *Ludwig Christoph von Hellwig: Nosce te ipsum vel anatomicum vivum, oder kurtzgefasstes und doch richtig gestelltes anatomisches Werk,* etc. *Franckfurt u. Leipzig (1720),* small folio, with four large poorly engraved copperplates drawn by Johann Heinrich Werner. The latter however is the second edition of the work, prepared by Hellwig's son, Theodor Andreas, who signs the preface under date of May 16, 1720. The dedication was signed by his father on May 2 of the same year. Haller (*Bibl. anat.*, II, 81) speaks also of a third edition published in Frankfort and Leipzig, about 1745, and prepared by another son of Hellwig's, Johann Gottlieb.]

Haller: I, 332.
Moehsen: *Bildn.*, p. 116; *Leben Thurneissers zum Thurn,* Berlin, 1783, 4°, p. 69.
Lordat: *Iconologie médicale,* Montpellier, 1833, 8°, p. 84.

[1] *Idem,* Frankfort, 1584, fol.; *idem,* Nuremberg, 1686, 4°.

PIETRO BERRETTINI

Pietro Berrettini, Pietro da Cortona, a painter and architect, was born in Rome, in 1669. To him are attributed twenty-seven large anatomic plates, which were begun in 1618 and were engraved by an artist whose initials, *L. C.*, are given on Plates 1 and 4. The engraver, undoubtedly, is Luca Ciamberlano, a painter and copper engraver who worked in Urbino and Rome. But neither in Berrettini's biographies nor in those of Ciamberlano's is there any mention made of these plates. They were also unknown to Bartsch (*Peintr. grav.*, Tom. XX). In the lower left-hand corner of the first plate is found, *Petr. Berret. Corton. delin.* In the copies of both editions that were in Choulant's possession the year (1618) had been erased. According to Moehsen, page 100, it is supposed to have been given, although Petraglia says in the preface to the second edition of 1788: *Petrus enim Berrettini has easdem tabulas elaborare coepit anno 1618, ut ex prima tabula patet.* ("For Petrus Berrettini began to work over these same books in the year 1618, as appears from the first book.") Both the anatomist, Johann Vesling (1598–1649), and the surgeon, Gulielmo Riva (d. 1676, *aet.* 50), have been mentioned as the anatomists for whom these plates had been made, but Vesling was then too young and Riva was not yet born in 1618. Later Hunter wrote in a letter to Haller (*Bibl. anat.*, II, 702) that he possessed these plates under the title: *Vente tavole anatomiche fatte da Pietro da Cortona nel ospidale di S. Spirito in Roma ajutato dal celebre chirurgo Nicolas Lache.* But, according to Petraglia's assurances, the latter name (Nicolas Lache) does not occur on the roll of the hospitals of *San Spirito in Saxia*, at Rome. Perhaps the name is Larche. Larche was a surgeon who is said to have studied anatomy in Rome with Nicolas Poussin. According to Hunter the chief object of these plates was to teach neurology (*scopum primarium nervos esse*), and all the rest was added by some person without judgment. Berrettini's plates seem indeed to prove the first part of this assumption in so far as the nerves are everywhere emphasized and their representations are made more prominent by means of crosshatching. This seems to be especially true of the first twenty plates. The other seven show an entirely different treatment, and it appears therefore that Hunter saw only the first twenty. And he must have seen them in the edition of 1741, with the extra figures



engraved upon each plate by Petrioli to whom he probably refers as the person *nullius iudicii*, "of no judgment." The quoted Italian title was probably given only in handwriting on the cover of the copperplates.

Moehsen, on the other hand, tries to prove that Joannes Maria Castellanus was the anatomist for whom Berrettini's plates were made. Plate 24 of Berrettini's work, representing the veins, is, according to Möhsen, contained in Castellanus' work on bloodletting arteries and veins: *Phylactirion phlebotomiae et arteriotomiae cum figura admodum necessaria et utili venas et arterias totius corporis tam antiquis quam nostri seculi chirurgis secari solitas ad vivum repraesentante, Argentorati*, 1628, 8°. ("A handbook of phlebotomy and arteriotomy with a picture very essential and useful showing in a lifelike manner the veins and arteries of the whole body that were usually cut by ancient physicians as well as those of our own time.") Castellanus is said to have prepared for publication a larger anatomic work in folio. But all this proves little, since there has always been some doubt as to whether Plates 21 to 27 really belonged to Berrettini's series. They show a different treatment from the first twenty plates, while the drawing of Plate 24 is especially poor as compared with all the rest. One might much rather be inclined to think that this plate was inserted among Berrettini's plates and was taken from the older work of Castellanus. From all this but little has been ascertained as to what anatomist the Berrettini plates may be assigned.

The copperplates of these prints were hidden for a long time. But nothing historic is said in the two editions about the place where they had been kept, or their previous possessor, or about the way they were found, or the fact that they really were done by Pietro da Cortona. This silence is particularly striking in the first edition of the loquacious and boastful Petrioli, whose acquaintance we have already made in the article on Eustachius (page 200). The plates were not kept in very good condition, as is clear from some of the prints. A previous owner of the plates, perhaps Petrioli himself, crowded the first nineteen plates with a number of anatomic accessories which he took from Vesalius, Casserius, and others, and which were done by a different artist and a different engraver. Petraglia had these figures erased. Therefore they can only be found in the first edition. Berrettini's figures are, in the main, representations of entire bodies in action or some active attitude, which always renders anatomic figures rather repulsive. The first nineteen plates deal chiefly with muscles, nerves, and bloodvessels. Plate 20 represents in one figure the opened spinal column and in a great many

smaller figures around it, the different vertebrae. These latter figures might be regarded as among those Petrioli added, although Petraglia left them on the plate. Plates 21–23 deal in many small figures, with the brain, the eye, and the ear. These figures differ somewhat from the other figures both in the drawing and the engraving. Plate 24 represents the cutaneous veins and valves of the veins. Plate 25 represents the spinal column and the spinal cord taken out of it. Plate 26 shows three skeletons in Vesalius' style as far as the space on one plate permitted. Plate 27 represents a standing female figure with the abdominal cavity open. A side figure on the same plate shows the open uterus with the foetus. These figures are the only representations of a female body in the whole collection. Yet one would prefer to include this plate among the genuine Berrettinic plates rather than any of the six preceding it. All the plates, by the way, were intended for physicians and not for artists. They are indeed of little use to the latter. The two editions of these plates are as follows:

Tabulae anatomicae a cel. pictore Petro Berrettino Cortonensi delineatae et egregie aeri incisae nunc primum prodeunt et a Cajetano Petrioli Romano, Doctore, etc., *notis illustratae. Impensis Fausti Amidei bibliopolae, Romae*, 1741, *ex typographia Antonii de Rubeis*, fol., 4° and 84 pp. and 27 copperplates in folio.

This edition contains the nineteen plates with the accessory figures on the blank spaces, which are not Berrettini's work. It also contains Petrioli's commentary which has little anatomic value. The publisher says in a short preface: *auctoris qui has tabulas confinxit nomen ignoratur* ("the name of the author who composed these books is unknown"), and does not mention Berrettini. On the title is a copper vignette representing, among other subjects, the transfusion of blood.

Tabulae anatomicae ex archetypis egregii pictoris Petri Berrettini Cortonensis expressae et in aes incisae. Opus chirurgis et pictoribus apprime necessarium. Alteram hanc editionem recensuit, nothas iconas expunxit, perpetuas explicationes adjecit Franciscus Petraglia, philosophiae et medicinae professor, Romae, 1788, *impensis Venantii Monaldini bibliopolae, excud. Johann. Zempel*, fol., 16 and 104 pp., and 27 copperplates.

In this edition, all the accessory figures on the first nineteen plates are erased, so that the original figures stand out better. The publisher's dedication is followed by an interesting preface of the editor and his new commentary on these plates. On page 1, we recognize the vignette engraved by Pierleone Ghezzi which occurs in Petrioli's eight plates

supplementary to Eustachius' plates. Here the inscription is not given. In the lower left-hand corner we read: *Eques Petrus Leo Ghezzius Inu. del. et scul.* (see pp. 201 *et seq.* The skeleton is in the left part of the picture. The lecturer is placed at the right of the cadaver. On the title-page there is another vignette also representing the opening of a cadaver, at the bottom, *Giuseppe Pirovani inv. et dis., Antonio Fiori incise;* on page ix of the preface is another, inferior vignette probably representing Polyphemus; below at the right: *Vacca inv. et sculps.* This edition, although it contains the later prints, is to be preferred to the first edition. It is said that there exist colored copies of this edition. The Göttingen Library possesses a manuscript with the pictures of Guilielmo Riva, and thirty-two illustrations partly humorous, and partly pertaining to surgery and anatomy. These are followed by Berrettini's plates as they appeared in Petrioli's edition (Haller: *Bibl. anat.*, I, 579).

The anatomical theater of the hospital of *Maria della consolazione* in Rome possesses the first of Berrettini's plates done in color and of more than life size. The above-mentioned Riva attended anatomic studies in this hospital (Petraglia's preface).

Moehsen: *Bildn.* p. 99.
Haller: I, 340, 579; II, 572.
Ebert: no. 2028–29.
Weigel: no. 17775.

GASPARO ASELLI

Gasparo Aselli was born in Cremona about 1581 and died in 1626. He was professor in Pavia and, on July 23, 1622, discovered the chyliferous vessels, which had not been observed since the days of Erasistratus. He died before he had been able to publish the treatise dealing with his discovery. The Milanese physicians Alessandro Tadini and Senator Settala or Settalio published it after his death under the title:

De Lactibus Siue lacteis venis Quarto Vasorum Mesaraicorum genere Nouo Inuento Gasparis Asellii Cremonensis Anatomici Ticinensis Dissertatio Qua Sententiae Anatomicae multae, uel perperam receptae conuelluntur, uel parum perceptae illustrantur, Mediolani, apud Jo. Baptistam Bidellium, 1627, 4°, copper-title, 6 leaves of printed preliminaries, 79 pp. and 4 unnumbered leaves in quarto, with 4 polychrome woodcuts in folio, and a copperplate in 4°, the portrait of the author.

The woodcuts are treated in a very spirited manner and in colored chiaroscuro. On each plate four colors are used as follows: black for the background, the contours, and the crosshatching, and also for indicating the veins and for the letters engraved upon the figures; white, the color of the paper, for numbering the plates on the black background and for the chyliferous vessels in the figures; dark red for the arteries, for crosshatching, and for shadows *en masse;* light red for the surfaces of the intestines, the mesentery, and the liver. All the figures represent animal not human organs. This very rare work contains therefore the earliest anatomic illustrations in colored printing. [As regards his work containing woodcuts in color see Weigel: *Kunstkatalog*, no. 18405.] There is no engraver's mark on the woodcuts, nor is he in any way mentioned in the book itself. The copper-title, as well as the portrait of the author in his forty-second year, bears the signature of (Caesar) Bassano as the engraver, and consequently must have been engraved in 1623. It is of superior execution and is surrounded by the following inscription: *Gaspar Asellius civis Cremonensis anatomicus Ticinensis anno aetatis XLII;* and at the bottom *Gasparis haec facies—illa fuit.* One may therefore attribute these woodcuts either to this artist, who was also a wood engraver, or to Domenico Falcini with whom he worked and of whom we have other sheets from three wood blocks. A very beautiful copy of this extremely rare original edition, which was never duplicated

by any of the later editions, is now in the possession of the Leipzig Pauliner or University Library. It formerly belonged to Johann Zacharias Platner, later to Johann Benjamin Boehmer, Christian Gottlieb Ludwig, and Johann Karl Gehler. Aselli's book was again printed:

Basil. 1628, 4°, typis Henric—— Petrinis, 12 and 67 pp., and 4 copperplates in 4°.

These copperplates are reduced copies of the woodcuts of the original edition and are engraved in reverse, and printed only in black. There are no woodcuts at all in this edition. A new impression was published without changes:

Lugd. Bat. 1640, 4°, ex officina Johannis Maire, 8 preliminary leaves including 4 copperplates, 104 and 8 pp.

These plates are re-engraved and are likewise reduced in size and printed in black. The first three are reversed as compared with the woodcuts, the fourth one is not reversed. The text and the prefaces are the same. There is some doubt about another edition: *Lugd. 1641, 8°.* Reduced copies of these engravings are also contained in Manget: *Theatrum anatomicum.*

In the edition of Adrian Spieghel's works, *Amsterdami, 1645, fol.*, Aselli's treatise is also printed. Here the copperplates are also printed black, but, are not reversed and not so small as in the Basel edition. On the other hand, they seem to show a rather arbitrary treatment of the chyliferous vessels. In both editions (1628 and 1645) the editors boast of having done the illustrations *formis elegantioribus* which probably refers to their choice of the copperprint in place of the woodcut. Haller says of them, and justly (*icones*), *fere corruperunt.*

Moehsen: *Bildn.*, p. 138, Appendix, p. 9.
Haller: I, 362.
Ebert: no. 1276.
Knolle (Johann Friederich): *Decas librorum anatomicorum variorum.* Lips., 1761, 4°, p. 5 *et seq.*

JACOB VAN DER GRACHT

Jacob van der Gracht, a painter and etcher in The Hague, spent several years abroad. No pictures or copperprints credited to him are known. But the following work is ascribed to him:

Anatomie der witerlijke deelen van het menschelijke ligchaam, ten dienste van Schilders, Beeldhouwers en Plaatsnijders door Jacob van der Gracht, Schilder, 's Gravenhaag, 1634 (1660), fol.

The copperplates were etched by the author himself. It is the earliest of all independent works written on the external parts of the body for the needs of graphic or plastic artists.[1] (Cf. p. 377.)

[This work, which is very rare even in Holland, was a highly appreciated present to Choulant from Mr. Groshans, lecturer in Rotterdam. The copper-title is in folio and represents twelve persons standing around a model, two of them lecturing and demonstrating, the remainder listening. At the bottom are two allegoric figures, Painting and Sculpture. The title is engraved on the pedestal as follows: *Anatomie der wtterlicke deelen van het Menschelick Lichaem. Dienende om te verstaen ende volkomentlick wt te beelden alle beroerlicheit des selven Lichaems. Aengewesen door Jacob van der Gracht Schilder. Bequaem voor Schilders, Beelthouwers, Plaet-snyders, als oock Chirurgiens. Wtgegeven door den Auteur, Jn s'Graven Hagae, Cum Privilegio, 1634.*

There are fifteen folio copperplates besides the copper-title, numbered II–XVI and representing muscles and bones after Vesalius. These fifteen folio plates are preceded by two others which are not numbered and represent upright skeletons after Vesalius and one reclining skeleton. The Dutch commentary is printed after André du Laurens, Bartholomaeus Cabrol, and Andreas Vesalius. The printing takes up even the space on the back of the copperplates. Counting the copper-title there are altogether eighteen plates, all etched by the author himself. Text and plates together take up thirty-three pages, with signature *A–H* following. Samuel van Hoagstraaten, in his *Inleiding tot de Hooge Schoole der Schilderkonst* (Rotterdam, 1678, 4°), reproaches Jacob van der Gracht for writing for surgeons rather than for painters: *zelf van der Gracht leyt meerweegs voor heelmeesters als voor Schilders af* (page 52).]

Haller: I, 382.

R. van Eijnden en A. van der Willigen: *Geschiedenis der vaderlandsche Schilderkunst.* 3 Deelen, Haarlem, 1816. 8°, I, 221.

[1] This edition is the first so-called anatomic atlas that was published for artists in Holland. Choulant believed it rare, but De Feyfer, *op. cit.*, p. 473, says that this is incorrect.

JOHANN VESLING

Johann Vesling was born at Minden in 1598 and died at Padua, August 30, 1649. He lived for some time in Egypt and Palestine and in 1632 became professor of anatomy at Padua and soon after director of the botanical gardens there. He later made a scientific journey to Candia and the Orient for the study of botany. As professor of anatomy, he wrote a good and much-used manual:

Syntagma anatomicum. Patavii, 1641, 4°; *Patavii*, 1647, 4°, enlarged and provided with copperplates; later often edited with additions by *Gerard Blaes, Blasius, thus Trajecti ad Rhen.* 1696, 4°; translated into German by *Ger. Blaes*, Leiden, 1652, 4°; into Dutch by the same, Leiden, 1661, 8°; into English by *Nicholas Culpeper*, London, 1653, fol.

This manual contains twenty-four copperprints (in some editions less) of rather inferior quality and without any artistic value. They were intended for the commonest needs but are mostly original engravings and represent some organs of the human body more correctly than their predecessors. They were very popular at the time of their appearance and have been frequently re-engraved.

These same twenty-four copperprints were published with a simple commentary and without the other text under the title:

Tavole anatomiche del Veslingio spiegate in Lingua Italiana, Padova, 1709, fol., *per la V(edova) Frambotti e Gio. Battista Conzatti*, 28 pp. and 24 copperplates.

On these prints Giovanni Georgi is named as the artist or engraver. The elucidation of each print takes up an entire page.

[The Latin edition of Vesling's *Syntagma anatomicum, Trajecti ad Rhenum*, 1696, 4°, bears the date, 1695, on the copper-title. It contains an *Appendix ad anatomen Veslingianam recentiorum inventa varia proponens* on pages 309–560, and eight pages of index. The *Appendix* comprises twenty-eight quarto copperplates, most of them taken from other anatomic works. Plates 9 and 13 are identical. Most of these, like Vesling's own plates, are incorrectly numbered. There are several other editions of the *Syntagma*, besides those mentioned here.]

Haller: I, 391.

JOHANN GEORG WIRSUNG

Johann Georg Wirsung, Wirsueng, was Vesling's prosector in Padua. He was born in Augsburg and was assassinated on August 22, 1643. In 1642 he discovered the excretory duct of the pancreas in the human body which still bears his name. He made a life-size representation of the duct and published a copperprint of it with a short commentary.

[Through a gift of Mr. Börner, auctioneer in Nuremberg, Choulant came into possession of this rare plate. Wirsung's illustration of the

WIRSUNG'S PANCREATIC DUCT

pancreatic duct, 1642, is a small oblong folio. At the top of the title: *Figura ductus cuiusdam cum multiplicibus suis ramulis nouiter in Pancreate á Jo. Georg. Wirsung / Phil. et Med. D. in diuersis corporibus humanis obseruati.* Below this in the center of the plate, a figure of the pancreas with a small part of the duodenum to the left, dissected so as to show the anastomosis, one above the other, of the ductus choledochus and the ductus pancreaticus. A part of the former can also be seen outside of the duodenum. To the right is a part of the spleen with the dichotomous entering artery and emerging splenic vein; both are shown continued in the dissected pancreas, as is the ductus pancreaticus coming from the duodenum, with twenty-one roots entering the pancreas on both sides. Letters that are engraved upon the anatomic parts refer

to a Latin explanation engraved upon the lower third of the copperplate; on the right side at the bottom: *Paduae. 1642.* This plate shows that the name is *Wirsung* and that Wirsüng, originating in the Latinization, is wrong. A sketched copy of this plate is said to be in the University Library at Leipzig.]

Two copies of this very rare print in folio were in the *Bibliothek deutscher Nation* at Padua, and, through Caldini, one of these came into Blumenbach's possession.

Haller: I, 415.
Blumenbach: p. 206.

[THOMAS BARTHOLINUS

Thomas Bartholinus, born at Copenhagen, October 20, 1616, was the son of the Danish anatomist Caspar Bartholinus senior and studied in Copenhagen. From 1637 on, he traveled through Holland, visited Paris and Montpellier, then Padua, where he remained three years, and after this Italy, Sicily, and Matta. In 1645, he received his doctor's degree at Basel. In Copenhagen, he first became professor of anatomy, which position he held until he retired in 1661 to live on his country estate, Hagested. In 1670, Hagested, with his library and his manuscripts, was destroyed by fire. He died on December 4, 1680. Having a broad education and a good knowledge of the Greek and Arabic languages, and being an ardent student of history and archaeology, he took an active part in the anatomic and physiologic labors and discoveries of his time, particularly in the discovery of the lymphatics. He was also actively interested in pathologic anatomy, and was extraordinarily productive as an author. In line with our present discussion belongs only his very much-used anatomic textbook, in reality, a revision of his father's *Institutiones anatomicae* (published in Viteberg, 1611, 8°), under the title:

Caspari Bartholini Institutiones anatomicae auctae ab auctoris filio Thoma Bartholino, Lugd. Batav., apud Franc. Hackium, 1641, 8°.

Besides this first edition there appeared three other original editions:

Caspari Bartholini Institutiones anatomicae secundum locupletatae, Lugd. Batav., 1645, 8°.

Thomae Bartholini Anatomia ex Caspari Bartholini parentis institutionibus, Lugd. Batav., 1651, 8°.

Thomae Bartholini Anatomia ad circulationem Harvejanam et vasa lymphatica, quartum renovata, curante Gerardo Blasio, Lugd. Batav., 1673, 8°.

In a short time, many other editions were published in German, French, Italian, Dutch, and English. Among the Italian was one in verse.

Many illustrations have been added, differing in the various editions, but few of them original. Most of these are after Vesalius, Casserius, Vesling, Bauhin, Ruysch, and others; a great many are taken from monographs, such as Stensen, Regner de Graaf, Franciscus Sylvius, Folius, and from writings on the lymphatics, a branch of anatomic research to which the author's original works especially belong.

The workmanship on the copper engravings is unequal, but for a compendium, is on the whole commendable. The illustrations of the brain by Sylvius appear for the first time in the edition of 1641 drawn by Sylvius himself and engraved by J. Voort-Kamp, whose name is given on three plates.

Thomas Bartholinus wrote, in a small book of sixty-three pages, a history and description of the Copenhagen anatomic theater, founded in 1644, during the reign of King Christian IV. It was published under the title:

Domus anatomica Hafniensis brevissime descripta. Hafniae, literis Henr. Gödiani, sump. Petri Haubold 1622, small 8° (appended to the latter *Cista medica Hafniensis. Hafn. typis Math. Godichenii, impensis Petri Hauboldi*, 1662, small 8°).

This has for its frontispiece a view of the house which the anatomic theater occupied, and an interior view of the theater itself, both on one copperplate. Two woodcuts, printed in between the text, represent illustrations of the ticket (*tessera*) for admission to the anatomic theater and of the seal of the Medical Faculty of Copenhagen, which Christian III bestowed upon it in 1537. In the index to the author's own anatomic collection (page 62) are also mentioned: *Icones plerarumque partium tam interiorum quam exteriorum humani corporis, naturali magnitudine et forma secundum ductum sectionum Thom. Bartholini á Carolo van Mander Apelle Regio vivis primum coloribus, deinde ab Alb. Haelwegh Regio glypte aeri inscisae, pro Anatome Augusta, necdum ultimam manum adeptae.* The younger Karl van Mander, who is meant here, was a court painter at Copenhagen. The remarkable prints by the copper engraver, Albert Haelwegh, are also indexed in a separate catalogue by Sandvig. Karl Friederich von Rumohr also speaks of the plate mentioned by Bartholinus, in his *Geschichte der Kopenhagener Kupferstich-*

sammlung, Leipzig, 1835. Prints of these plates are not known and nowhere is mention made of any work that might contain them. Perhaps they were never published, as Haller mentions (*Biblioth. anatom.*, I, 404), or perhaps the fire which destroyed the country-house at Hagested near Copenhagen destroyed both the plates and the prints, Bartholinus' library being completely ruined by that fire. An inquiry regarding these plates made in Egger's *Deutsches Kunstblatt*, February, 1852 (No. 8, page 70), was unsuccessful.

The expression *Anatome Augusta* in Bartholinus' words quoted above may indicate that they were made for the king's use, since Bartholinus boasts of the fact (p. 6) that King Frederick III more than once attended his anatomic demonstrations in the anatomic theater: *demonstrationes nostras non semel clementi oculo inspexit* ("has more than once looked on at our demonstrations indulgently"). Or one might, as Haller does, take them to indicate the edition of an anatomic work planned by the king which, however, is less probable.]

[PHILIPP VERHEYEN

Philipp Verheyen was born on April 23, 1648, in Verrebroeck, a village in Belgium, and at first devoted himself to agriculture, as his poor parents had done. In 1675 he went to the university in Louvain to study theology. The amputation of a foot, made necessary by illness, rendered him unfit for the clerical profession, and he took up the study of medicine at Louvain and Leyden. At the former university, in 1683, he obtained his doctor's degree. In 1689, he became professor of anatomy, and also professor of surgery, in 1693. He became known through successful researches and gained the reputation of an industrious anatomist. He died at Louvain on January 28, 1710. His anatomic compendium *Corporis humani anatomia* replaced Bartholinus' as the preferred textbook. Its numerous, though generally small and inferior copperprints were later inserted in Kulmus' plates. There are a great many editions of this compendium, which seems to indicate that its use has been widespread.

Distinction should be made between two editions, the second of which is greatly enlarged and improved.

The first edition was published at Louvain, 1693, 4°, *Lips.*, 1699, 8°; *ibid.*, 1705, 8°; *ibid.*, 1716, 8°. A German translation was published at Leipzig, 1704, 8°; Leipzig, 1705, 8°; 1714, 8°; Königsberg, 1739, 8°. It was translated into Dutch by A. D. Sassenus, under the title: *Ontleedkundige beschryvinge van het menschen ligham*, Brussels, 1711, 8°, some plates of which probably belong to the second edition.

The second edition was published in two volumes, the first one bearing the title: *Corporis humani anatomiae liber primus—editio secunda ab Authore recognita novis observationibus et inventis pluribusque Figuris aucta*, etc., while the second volume is entitled: *Supplementum anatomicum sive anatomiae corporis humani liber secundus, in quo partium solidarum Libro primo descriptarum Usus et Munia explicantur. Accedit descriptio Anatomica partium Foetui et recenter nato propriarum. Item, Controversia de Foramine ovali inter Authorem et D. Mery. Opus variis figuris illustratum, Bruxellis, apud fratres t'Serstevens*, 1710, 4°. It is in two volumes of 400 and 436 pages respectively, not counting the prefaces, which contain a biography and a portrait of Verheyen. The first volume contains 40, the second volume 6 anatomic copperplates.

This edition was reprinted in *Bruxell.* 1726, 4° in two volumes. The second volume of the edition, *Supplementum anatomicum*, also appeared separately, *Amstelod.* 1731, 8°. Reprints of both volumes, somewhat enlarged, were published in *Genev.* 1712, 4°; in *Neapoli*, 1717, 4°; in *Neapoli*, 1734, 4°; *Amstelod. ac Lips.* 1731, 8°, *apud R. et J. Wetstein et W. Smith*, with newly engraved copperplates, in two volumes.

See also Haller: *Bibl. anat.*, I, 755; II, 769. C. Broeckx: *Essai sur l'histoire de la médecine Belge avant le XIX. siècle. Gand, Bruxelles, et Mons*, 1837, 8°, pp. 160, 315.]

AMÉ BOURDON

Amé Bourdon was born in Cambrai in 1638, became a physician there, and died on December 21, 1706. He published:

Nouvelles Tables Anatomiques Ou sont représentées au naturel toutes les parties du Corps humain, toutes les nouvelles découvertes, le cours de toutes les humeurs, etc. *On y a joint un petit liure, qui en fait la description et en explique clairement les Vsages avec ordre et en peu de mots. Le tout déssiné et composé par Amé Bourdon Médecin. Elles se vendent en blanc et enluminées à Cambray chez l'Auteur, à Paris chez Laurens D'houry*, 1678, large tallfolio, 8 plates without text.

These plates were mostly done with the etching needle and the burin, and are for the most part imitations of previous pictures. They are inconvenient for practical use and have no particular anatomic or artistic value. On the other hand, they are very rare. The first plate represents a front and back view of a male body and also bears the title given above. The second, consists of four front views of the trunk. The third, shows the abdominal viscera, and the fourth, the thoracic organs, the genitals, and the brain. The fifth and sixth plates are representations of the bones and the muscles, the seventh and eighth of the nerves and the blood vessels. All the plates are signed: *Amé Bourdon delineavit, excudit C. P. (cum privilegio) Regis, Daniel le Bossu sculp.*

The text that belonged to these plates was later republished under the title: *Nouvelle description du corps humain*, Paris, 1683, 12°, and the plates were also added to this edition. After Bourdon's death they were published again: *Paris et Cambray*, 1707, fol., but probably under a new title.

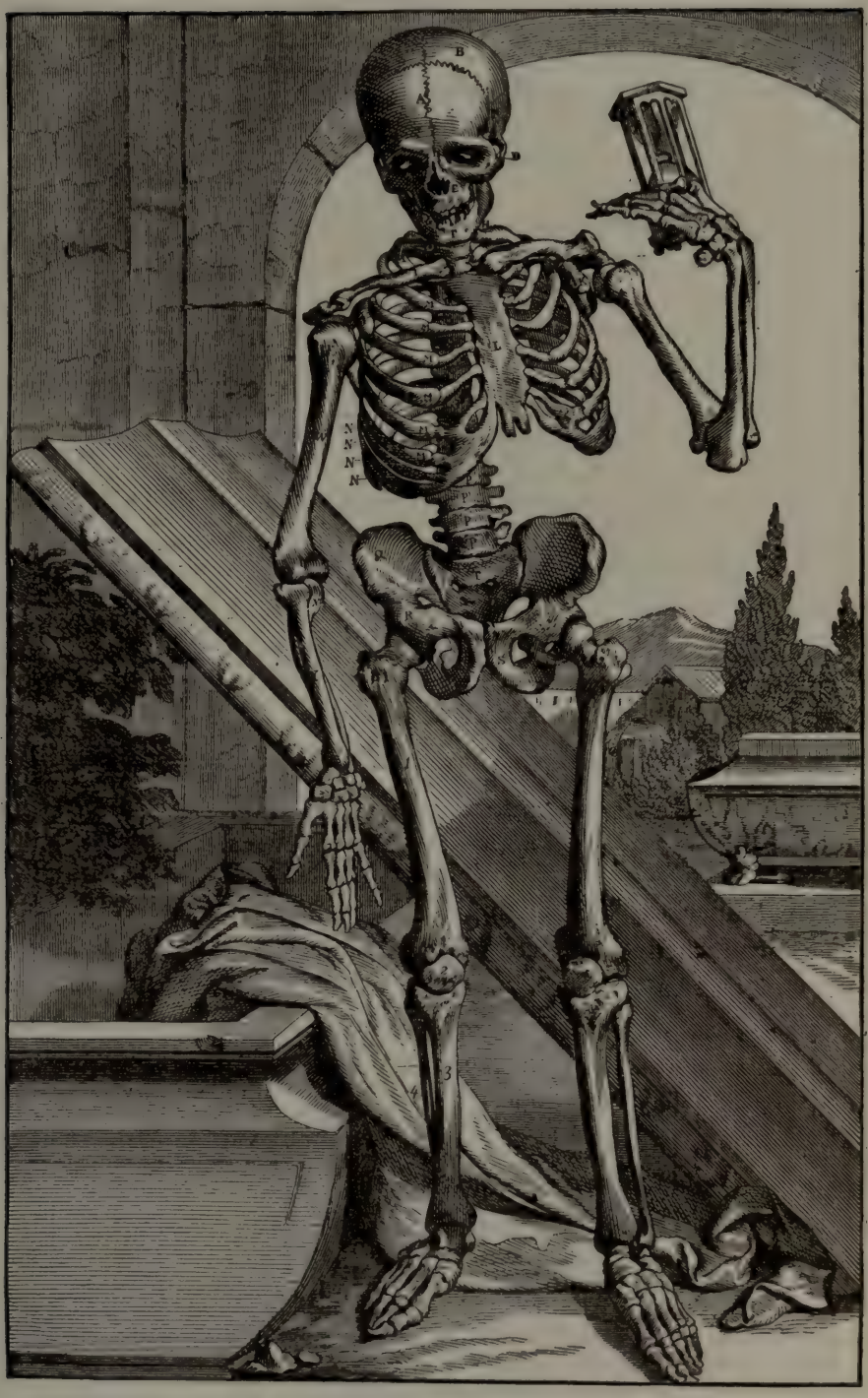
Moehsen: *Bildn.* p. 104, note.
Haller: I, 658.
Haller: in Boerhaave: *Methodus studii medici*, I, 531.
Ebert: no. 2866.

GODFRIED BIDLOO

Godfried Bidloo was born at Amsterdam on March 12, 1649, and died at Leyden in April, 1713. From 1688, he was professor of anatomy at The Hague and, beginning with 1694, held the same position in Leyden. Later he was appointed body physician of William III, of England, and returned to Leyden after the latter's death in 1702. We possess a large work of his on the whole anatomy of the human body bearing the title:

Godefridi Bidloo, medicinae doctoris et chirurgi, Anatomia humani corporis, centum et quinque tabulis per artificiosiss. G. de Lairesse ad vivum delineatis, demonstrata. Amstelodami, sumptib. viduae Joan. à Someren, haeredum Joan. à Dvk, Henrici et viduae Theodori Boom, 1685, large fol., 5 leaves of printed preliminaries, 107 copperplates, a page of text to each anatomic plate.

Besides the one hundred and five anatomic plates the work contains an allegoric copper-title on which the following words are inscribed on a small shield: *Godefridi Bidloo Medicinae Doctoris et Chirurgi anatomia humani corporis centum et quinque tabulis illustrata.* Then comes a bust picture of Bidloo and the 105 plates, all in elephantine folio. The drawings are by Gerard de Lairesse (b. Liège 1640, d. Amsterdam 1711). The engravers are not mentioned anywhere, except that beneath Bidloo's bust is engraved: *G. Lairesse pinx. A. Blooteling sculp.* According to Haller the engravings were done by Van Gunst; see Herman Boerhaave: *Methodus studii medici ed. Alb. ab Haller,* I, 531. Moehsen names the brothers Peter and Philip Van Gunst as the engravers. The first three anatomic plates are representations of the nude bodies of a man seen from the front, and of a woman seen from front and back. They all have a great many accessory designs in Lairesse's well-known style and are all spoiled by absolutely unnecessary letters engraved upon them. The drawing of the nude figures is entirely in French taste, revealing more affected than natural beauty. The other anatomic figures are correct, as far as the artist was able to observe, but they show the lack of expert anatomic guidance. This is particularly true of the drawings of the muscles, and the characterization of the tissues is frequently incorrect. The engraving is most elegantly done and is artistically perfect. The exposition of the plates is too short to



be instructive. The work was unsatisfactory to professional anatomists because of the high scientific standard of anatomy at that time, and was too expensive for the beginner. It was absolutely useless to the artist since the complete musculatures are missing, and the muscles were generally misplaced. The two skeletons do not show natural proportions and are lacking in beauty.

Ontleding des Menschelyken Lichaams, Amsterdam 1690, fol., is a Dutch translation of the text with impressions from the one hundred and five original plates.

On account of the probably small sale of the work the publishers gave three hundred impressions of these plates to the English surgeon and anatomist, William Cowper (1666–1709). He later published these plates with a new text in English over his own name:

William Cowper: *The anatomy of humane bodies with figures drawn after the life by some of the best masters in Europe in 114 Copper-Plates*, Oxford, 1697, large fol., 116 copperplates.

The copper-title is that of the original edition except that the shield which contained the former title and Bidloo's name now bears Cowper's name and the changed title. Moehsen points out that this title was pasted on the shield. The second copperplate represents Cowper's picture painted by John Closterman (1656–1713) and engraved in mezzotint by John Smith (1654–1727). These plates are followed by the one hundred and five plates of Lairesse and finally nine plates of the same size, newly added by Cowper, which are drawn by Henry Cook and engraved by Michiel van der Gucht. Among them also are two well-executed plates, representing the front and back views of the entire musculature. On some of the plates of Lairesse, more letters were added which Cowper had put on in pen and ink.

Bidloo resented this crude piece of plagiarism most bitterly and an exchange of polemic writings between him and Cowper followed.[1] Afterward there appeared an English and later a Latin edition with impressions taken from the old plates. Both were published in Leyden by Johann Arnold Langerak. The English edition appeared in 1737, the Latin in 1739. The title of the latter is:

Anatomia corporum humanorum 114 tabulis, singulari artificio, nec minori elegantia ab excellentissimis, qui in Europa sunt, artificibus ad

[1] Notably Bidloo, *Gulielmus Cowper, criminis literarii citatus, Lugd. Bat.*, 1700, 4°, and Cowper, *Εὐχαριστία in qua dotes plurimae et singulares Godefridi Bidloo, perita anatomica, probitas*, etc., *celebrantur et ejusdem citationi humillime respondetur, Londini*, 1701, 4°. Boerhaave, in his *Methodus studii medici*, Amsterdam, 1751, judged the plagiarism of little moment on account of the slender value of Bidloo's text (*Tabulas certe habet optimas, descriptiones BIDLOIANAE nullius sunt momenti*, cited by Bayle).

vivum expressis, atque in aes incisis illustrata, amplius explicata multisque novis anatomicis inventis, medicis, chirurgicisque observationibus aucta a Guil. Cowper. Accedunt, etc. *Omnia nunc primum latinitate donata curante Guil. Dundass, Brittanno, M.D., Lugd. Bat., apud Jo. Arn. Langerak*, 1739, large fol., 115 copperplates.

The original inscription in the shield on the copper-title is erased. In place of it we read: *Anatomia Corporum Humanorum curante Guilielmo Cowper.* The bust pictures of both Bidloo and Cowper are missing. On the anatomic plates of Lairesse a few more letters are engraved. No commentary on the history of the book is given. On the printed title there is a copper vignette.

A later edition is also mentioned, viz., *Ultrajecti 1750, fol., max., cur. Radulph Schomberg.*

The anatomic work with the Lairesse plates is not included in Cowper's *Opera omnia amatomico-chirurgica, Lugd. Bat.*, 1715, 4°.

[William Cowper is also the author of *Myotomia reformata: or a new administration of all the muscles of the humane body*, London, 1694, 8°. After his death a finer edition was published: *Myotomia reformata or an anatomical treatise on the muscles of the human body, with an introduction concerning muscular motion*, London, 1724, fol. (Haller: *Bibl. anat.*, I, 768.)]

Moehsen: *Bildn.*, p. 104.
Haller: I, 693, 768.
Weigel: no. 17,777.

BERNARDINO GENGA

Bernardino Genga, of Mandolfe in the duchy of Urbino, was professor of anatomy and surgery and physician in the hospital of San Spirito in Rome. The anatomic preparations in the following book for artists are his:

Anatomia per uso et intelligenza del disegno ricercata non solo su gl' ossi, e muscoli del corpo humano, ma dimostrata ancora su le statue antiche più insigni di Roma. Delineata in più tavole con tutte le figure in varie faccie, e vedute. Per istudio della regia academia di Francia pittura e scultura, sotto la direzzione di Carlo Errard gia direttere di essa in Roma. Preparata sù i cadaveri dal dottor Bernardino Genga regio anatomico. Con le spiegazioni et indice del Signor Canonico Gio. Maria Lancisi. Opera utilissima à pittori e scultori et ad ogni altro studioso delle nobili arti del disegno. Data in luce da Domenico de Rossi, herede di Gio. Jacomo de Rossi, nella sua stamperia in Roma alla Pace, il di XV. Settembre, 1691, *Libro primo*, large fol., 56 copperplates.

The fifty-six copperplates are printed only on one side. On the engraved title the words *Libro Primo* seem to have been added later and are evidently meaningless since no *Libro Secondo* follows. There is also a dedication by Rossi addressed to *Giovanni Tiracorda, medico primario dell' Archiospedale di S. Spirito e gia pontificio.* This title is followed by an allegoric sheet with the emblems of Death and with the following inscription: *Ingredimur cuncti dives cum paupere mixtus.* Then follows the work itself. Of the plates with pictures nine pertain to osteology, and fourteen to myology; sixteen are representations of antique figures viewed from different sides, namely, the Farnese Hercules, the Laocoön (without his sons), the Gladiator, and the Borghese Faun. Of the plates with text seven pages are devoted to osteology, seven to myology, and one page to an *Indici delle cose notabili.* Thus the entire book consists of sixteen pages of text and forty pages of illustrations.

Yet there are copies of this edition consisting of fifty-nine pages, viz., seventeen pages of text and forty-two pages of illustrations, since they contain in addition to the antique representations, the Venus de' Medici, the Youth Pulling a Thorn from His Foot, and the Amazon of the House of Cesi. These copies have on some of the plates the signature *F. Andriot sc. Romae*, while in the ordinary copies the names

of the artist or engraver do not appear anywhere. They were probably put on the market later than the ordinary copies, with the additions given above. An English edition, published in London in 1723, is also mentioned.

All the plates are excellent anatomically as well as artistically. The work is even today one of the most useful for the needs of plastic and graphic artists. The engraver is probably François Androit (Handeroit), and the artist Charles Errard, director of the French Academy in Rome, who died there in 1689. The Papal physician Giovanni Maria Lancisi (b. October 26, 1654, d. January 21, 1720), to whom we owe the publication of the Eustachian plates, wrote the explanations.

Moehsen: *Bildn.*, p. 111.
Haller: I, 623.
Ebert: no. 8309.
Weigel: no. 17,776.

CARLO CESIO

Carlo Cesio, painter and copper etcher, was born at Antrodoco in the Papal States on April 17, 1626, and died at Rieti on January 6, 1686. He was a pupil of Pietro Berrettini of Cortona and lived in Rome. He maintained in his own house an academy for painters. He left a book of anatomic information for artists. At least such a book was published under his name after his death.

Carlo Cesio: Anatomia dei pittori. Cognizione dei muscoli del corpo umano per il disegno. Roma, 1697, fol.

It contains sixteen pages of illustrations with explanations, viz., two skeletons and fourteen myologic plates, among them five complete muscle-manikins, which, however, are not without anatomic errors. Johann Daniel Preissler (born in Nuremberg in 1666, died there in 1737 [?]) published these plates in a German edition at Nuremberg, 1706, fol., with newly engraved plates by Hieronymus Böllmann, of which there are six editions. The fifth of them is the following:

L'anatomia dei pittori del Signore Carlo Cesio, das ist: deutliche Anweisung und gründliche Vorstellung von der Anatomie der Mahler—zu mehrern Aufnahm der Mahler- und Zeichen-Kunst in das Teutsche getreulich übersetzet mitgetheilet von Joh. Daniel Preisslern—bei welchem sie auch zu finden. Fünfte Auflage. Nürnberg, 1759, fol. 16 copperplates with German elucidations etched upon them.

The preface is signed by Preissler, March 14, 1743. In it he says that the plates of Cesio were neatly and accurately engraved in copper with Hieron. Böllmann's assistance. His plates are lacking in anatomic accuracy and beauty. The illustrations, especially the bones, are too round and flat. These anatomic plates are also included in Preissler's book on the principles of drawing, but were omitted in the latest edition (Nuremberg, 1825, fol.).

[The first German edition is: *L'anatomia dei pittori del Signore Carlo Cesio. Das ist, Deutliche Anweisung und gründliche Vorstellung Von der Anatomie der Mahler—Zu mehrern Aufnahm der Edlen Mahler- und ZeichenKunst—In das Teutsche getreulich übersetzet Von Joh. Daniel Preisslern und in reine Kupffer-Stiche gebracht von Hieronymus Böllmann, Jn Nürnberg, mit Jhrer beederseits Verlag und Unkosten. Anno* 1706. fol. It contains sixteen copperplates with explanations in German

engraved upon the first eleven. There are four pages of printed prefaces (Weigel, no. 18,256, 57).]

Another German translation of Cesio contains sixteen copperplates with explanations engraved on them.

Eine herrliche Anweisung und wolgegründete Fürstellung von der Anatomie des gantzen Menschlichen Cörpers—denen recht Kunsterfahrnen Mahlern, Kunst-Zeichnern, Bildhauern—welche zuerst in Italiänischer Sprache herausgekommen von—Carlo Cesio, anjetzo aber—in der Teutschen Sprache herausgegeben und verleget von Jos. Frid. Leopold in Augspurg, 1708, fol., 16 copperplates with legends engraved upon them.

The dedication and the preface are signed by Leopold. In the lower left-hand corner of the first plate appears: *Elias Baeck alias Heldenmuth sculp. 1707;* in the same corner on the fourth plate: *Jos. Frid. Leopold excudit.* Baeck died in 1747. Leopold, publisher and engraver, died in 1726. A book by Cesio on the principles of drawing was also published and appeared probably after his death.

Carlo Cesio elementi del disegno, dati in luce dalle stampe originali di Matteo Gregorio Rossi. (Roma) In piazza Navona all' insegna della stampa, 4°.

Cicognara (*catal.*) referring to this book, refers to the figures as being *di bellissima e larga maniera sullo stilo Caraccesco,* "in the large and beautiful manner after the style of the Caracci." This, on the whole, is also true of all the other anatomic representations mentioned above. This drawing-book is exceedingly rare.

Moehsen: *Bildn.*, p. 103.

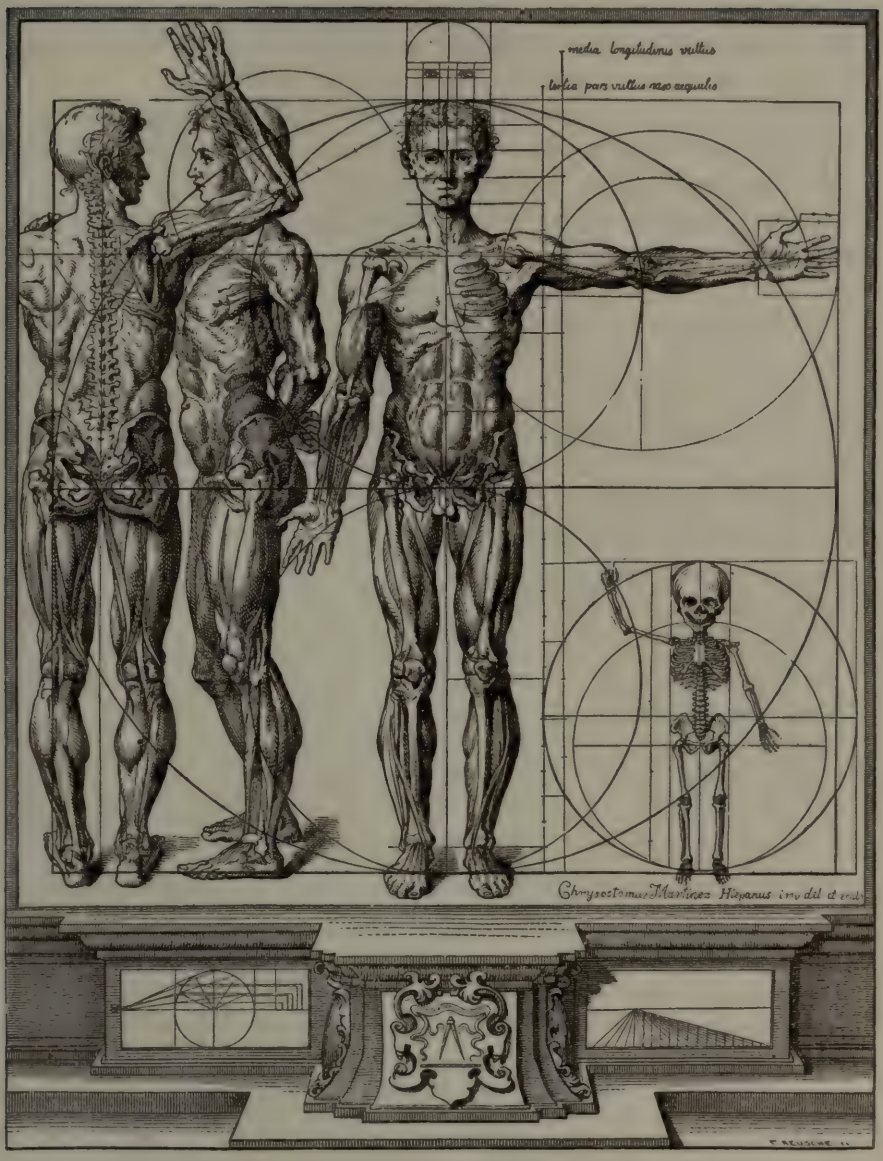
Pascoli (Lione): *Vite dei pittori,* etc. Roma, 1730–36, 4°, II, 163, *et seq.*

CRISÓSTOMO MARTÍNEZ

Crisóstomo Martínez, a painter and copper engraver, was born at Valencia about 1650, lived first in Valencia and later in Paris and in the Netherlands, and died there in 1691 or 1694. With the financial assistance of the city of Valencia, he essayed a book of anatomic instruction for artists. It is said that twenty copperplates were completed for this book. These plates probably remained in Paris, but a few good prints were sent to Valencia. It is doubtful whether the entire work was completely published. [We know of two copperplates in patent folio, numbered, but without date, and with engraved letters for reference. Both are very rare plates (one, osteologic, the other myologic) and are fairly correct as to anatomy. They are carefully and cleverly drawn and lifelike, with full crosshatching in the manner of clever line engraving, some lines with the needle.

1. The osteologic plate is 0.673 meters high and 0.523 meters wide and is divided into an upper and a lower half. The upper half represents monumental architecture and a cloudy sky, and as principal figures, two larger upright skeletons and eleven smaller ones in various positions. On one skeleton parts of the upper and lower extremities only are represented, of another one only the head and the neck. Muscles and body outlines are indicated by lines, bones are entirely crosshatched. The lower half of the plate represents on a larger scale the various bones in their entirety, sawed through lengthwise so as to show the diploë and the cavities of the long bones. With the exception of a few metacarpal bones and phalanges the bones of the hand and foot are missing. A few parts of the skull, also a few vertebrae, and one rib are given. The bones are placed around a pedestal-like stone. This plate bears no signature, but has numbers and letters engraved upon it.

2. The myologic plate is 0.685 meters high and 0.515 meters wide and shows on the left side, three upright muscle-manikins, representing views from three different sides, with the bones sketched in. The musculatures are fully crosshatched. To the right is an outline representation of a child's skeleton. All figures are surrounded by many proportional circles and lines. At the bottom, in the architectural drawing, there is engraved an escutcheon with a compass, a ruler, and a scroll bearing a text from Ezekiel; to the right and left are geometric


media longitudinis vultus
tertia pars vultus naso aequalis
Chrysostomus Martinez Hispanus inv. del. et sculp.

figures pertaining to the perspective. On the right side, above the lower field engraved in script: *Chrysostomus Martinez Hispanus Inv. del. et sculpsit cum privil. Regis.* The word *Hispanus* has been subsequently inserted in its place above the line.]

To the copy of the myologic plate that Choulant had, was pasted at the bottom a printed explanation of the picture, or rather a brief anatomic course for artists, in French under the title:

Nouvelles figures de proportions et d'anatomie du corps humain. Ouvrage non seulement utile aux Medecins et Chirurgiens, mais encore aux Peintres, Sculpteurs, Graveurs, Brodeurs et generalement à toutes les personnes sçavantes et curieuses de connoitre exactement la structure du Corps de l'Homme, designées d'après Nature et gravées par Chrysostome Martinez, Espagnol, Peintre Anatomiste, Paris, chez l'auteur. s.a.

Both plates were republished together in *Francofurti et Lipsiae, 1692, fol.*, and later a description was published in French: *Nouvelle exposition de deux grandes planches gravées et dessignées d'après nature representants des figures trés singulieres de Proportion et d'Anatomie,* Paris, 1780, 12°, accompanied by both plates. Cf. *Weigel: Kunstkatalog No. 20,416.* Both original plates are in the library of the Medico-Chirurgical Academy in Dresden.

Haller: I, 744; II, 768.

Cicognara: *Catal.*

Bermudez (Juan Agustin Cean): *Diccionario historico de los mas ilustres profesores de las bellas artes en España,* Madrid, 1800, 8°, III, 72.

Stirling (William): Annals of the artists of Spain, London, 1848, 4°, III, 1068.

PIERRE LANDRY

Pierre Landry, a copper engraver in Paris, was born in 1677, and died at Nanterre in 1741, but opinions as to the latter differ. There should be mentioned here one large plate by him, composed of four sections, all done in heavy engraving. It represents, rather correctly as to anatomy, a life-sized human skeleton in a reclining position, with an ermine coat and several other emblems around. On a label are Latin verses: *Hodie mihi cras tibi, etc.* and under them *Paris, chez Pierre Landry,* without any date. On the other side of the skeleton, another label contains anatomic explanations of the bone. It is probable that his plate was originally an emblematic representation, and was only later, and perhaps in order to increase its sale, made over into an anatomic representation by adding these osteologic explanations.

WILLIAM CHESELDEN

William Cheselden was born in 1688 at Burrow on the Hill, near Sowerby, in Leicestershire and died on April 10, 1752. As physician for several large hospitals in London and later chief surgeon in Chelsea he won distinction, especially in surgery. Of his anatomic works there should be mentioned:

The anatomy of the human body, London, 1713, 8°; 1722, 8°; 1726, 8°; 1732, 8°; 1741, 8°; 1778, 8°.

All of these editions contain very excellent copperplates differing, however, in number and content, for example, the edition of 1741 adds much from his osteologic work. The edition of 1778 contains forty copperplates engraved by Gerard Vandergucht (died in 1776 in London) some of which deal with subjects of a pathologic and surgical nature.

[There is a translation of his *Anatomy of the human body*, by August Ferdinand Wolff, with a preface by Johann Friederich Blumenbach, with forty copperplates engraved after Vandergucht by Riepenhausen, *Göttingen, b. Dieterich*, 1790, 8°, 20, 324, and 15 pages, 40 leaves of copperplates. Among the English editions the seventh should be mentioned as particularly fine. Lond. 1756, 8° (Blumenbach: *Introd. in historiam med. litterariam*, p. 319).]

Osteographia or anatomy of the bones. London, 1733, large fol.

This contains fifty-six splendid engravings which are said to have been drawn with the camera obscura.[1] They represent the bones in natural size, also animal skeletons and diseases of the bones.

Haller: II, 84.
Ebert: no. 4065.

[1] The title-page represents Cheselden himself in the act of making a drawing under the camera obscura. This is one of the finest of English works containing anatomic illustrations.

GIOVANNI DOMENICO SANTORINI

Giovanni Domenico Santorini was born at Venice, June 6, 1681, and died there, May 7, 1737. He was a pupil of Bellini and Delphini and from 1703 he was public instructor in anatomy and practicing physician. Later he became *protomedicus* and physician at the Spedaletto in Venice. Here he also lectured on obstetrics.

He was one of the most exact and careful dissectors of his day. His name and influence would have been far greater if death had not called him away before the completion of his chief work which was not published until thirty-eight years after his demise, and then only in part. Many corrections and discoveries in the detailed anatomy of different organs of the human body go back to Santorini. Even today a facial muscle (risorius), a pair of cartilages (cornicula) of the larynx, the emissary veins of the skull, and a part of the superior and inferior turbinates of the ethmoid are named after Santorini. Formerly a few other organs, too, were named after him, and there are doubtless many more that might just as properly bear his name. Haller, in his notes to Hermann Boerhaave's *Methodus studii medici*, I, 541, characterizes Santorini's efforts in the following way:

> In his observationibus anatomicum indefessum, in difficillimis partibus extricandis artificiossisimum et pene nimis perspicacem se gessit, si omnino hic aliquid nimii locum habet, cum multos musculos eius viri nemo recentiorum perinde distinctos vidit.
>
> "In these observations he showed himself an indefatigable anatomist, most skilful in extricating the most difficult parts, and almost too penetrating, if indeed, there is just ground for such a criticism in this, since many of the muscles (detected by) of this man have not been seen with equal distinctness by any of the more recent investigators."

This is true of his first book, which will be discussed here, and was the only one which Haller had seen, but it is not less true of his later works. His investigations covered almost all parts of the body. Apparently he never intended to publish a systematic textbook. Of his works the following should be mentioned here:

Observationes anatomicae. Venetiis, apud Joh. Bapt. Recurti, 1724, large 4°, 12 and 250 pp. and 3 copperplates in small fol. —*Lugd. Batav., ap. Gysbertum Langerak*, 1739, 4°, 12 and 256 pp. and 3 copperplates in small fol.

The plates of the first edition are done by Marco Galli, the engravings by Carlo Orsolini, at least, the second plate shows a signature in Latin to this effect. The engraver Orsolini was born at Venice, about 1710, and died there, about 1780. In the Leyden edition, which is a literal and complete reprint, the plates have been re-engraved in the same size by Nicolaus van der Meer and have probably also been drawn by the latter. They are signed *N. v. d. Meer Fecit.* The title vignette is also by him. The first plates represent a complete view of the facial muscles, the face seen from the front. The second and third plates show representations of the external ear and its muscles, the larynx and genitals of both sexes, among the latter a representation of a tubal pregnancy. The text treats of widely different organs of the human body. The book is dedicated to Czar Peter I and is, on account of the wealth of material it presents, even today of great value both for the history of anatomic discoveries, and to the professional anatomist. Haller, II, 24, expresses himself on this point, as follows: *Subtilissimus incisorum in hoc exiguo libro innumera nova inventa proposuit*, "in this unique book, the most subtle of dissectors sets forth many new discoveries."

Septemdecim tabulae quas nunc primum edit atque explicat iisque alias addit de structura mammarum et de tunica testis vaginali Michael Girardi in regia Parmensi universitate anatomes professor primarius, etc. *Parmae, ex regia typographia*, 1775, fol. min., 43 and 218 pp. and 21 copperplates in small fol., with as many plates in outline.

The first seventeen plates were by Santorini; two of the last four plates belonged to the anatomist Giovanni Battista Covoli (Cubolus) who was drowned, in 1768, in his youth. The other two belonged to the editor, Michael Girardi (born November 31, 1731, at Limona on Lake Garda, died June 17, 1797, at Parma), a professor of anatomy in Parma, who wrote a commentary for Santorini's plates, thus carrying out Covoli's plans and using, in part, posthumous writings of both Santorini and Covoli. Santorini had been preparing a new, enlarged, and improved edition of his *Observationes anatomicae* with this addition to the title: *quibus inventorum plurima, tabularum non modica accessio adjuncta est.* For this edition the seventeen plates with their explanations had been planned. All the twenty-one prints of the work are done in a light crayon effect which, however, does not impair the anatomic clarity of the prints, but even brings out well the differences in the tissues. Each plate is accompanied by an outline plate which is marked with reference letters. The seventeen plates by Santorini have a ruled margin at the top and

on the side, like the Eustachian plates, but have no signatures of the artists. They were drawn by Giovanni Battista Piazzetta (b. Venice 1682, d. 1754), who made the coppers for *Tasso's Gierusalemme liberata, Venez.*, 1745, fol. and was also the author of a book on drawing, engraved by Giovanni Marco Pitteri (*Venez.*, 1760, oblong folio). A woman, Florentia Marcella, engraved Santorini's plates under Santorini's personal supervision. Covoli's two plates (Plates 18, 19) are without the ruled margins and are also without signatures. Girardi's two plates (Plates 20, 21) are also without ruled margins, but are signed both by the artist and engraver. The former was Ignazio Gasparotti, the latter Giuseppe Patrini (d. 1786). The work belongs to the best of its time (as Haller recognized, II, 715), not only as regards the dissections and illustrations, but also as to the very elaborate commentary. The pictures deal with the facial muscles, the base of the brain and other parts of the brain, the organs of smell and hearing, the pharynx, the breasts, the heart, the diaphragm with the beginning of the thoracic duct, the stomach, the liver, the intestines, the pancreas, the ileocecal valve (Bauhin's valve), the bladder, the muscles of the perineum, and the genitals. Covoli's pictures represent the breasts, the tunics of the testicle and a six months' fetus.

The remaining collected works of Santorini were published in Parma, 1773, in 4°, with his portrait and his biography, and were edited by Michael Girardi. An Italian medical journal, *Giornale di Medicina*, 1763–76, 13 volumes, which Pietro Orteschi edited in Venice, also contains a biography of Santorini, written by the physician Niccolò Pollaroli, in Volume I, page 112.

Haller: II, 23, 714.
Ebert: no. 20322, 23.

COLORED ANATOMIC COPPERPLATES

The article on Aselli, page 240, mentions anatomic representations in colored woodcuts. In the following will be given an account of colored copperplates done by means of several impressions, dealing with human anatomy, i.e., the works of Le Blon, Ladmiral, and Gautier d'Agoty.

JACOB CHRISTOPH LE BLON

Jacob Christoph Le Blon (not Le Blond), was born at Frankfort on the Main, in 1670, and died at Paris, May, 1741. After a sojourn in Zürich, Paris, and Rome, he lived and worked as a miniature painter in Amsterdam where, in 1704, he made known his first attempts at colored mezzotinting. He used in this process three different impressions (blue, yellow, and red) for one picture and was thus able to produce the different color values without any black, by using only these three primary colors. He then went to The Hague and later to Paris and London in order to practice his art, which he had so far kept secret, with the aid of subscriptions. In London he had some success in this, but the venture finally failed, because of the little care devoted to the making of the plates, and on account of the inventor's extravagances. Thereupon Le Blon established a wall-paper factory in London, which soon failed also, so that in 1732 he was compelled to flee and return to The Hague, a poor man. Soon after he went to Paris. On November 12, 1737, he obtained a privilege and on July 24, 1739, a twenty years' patent for colored copper printing, which however he enjoyed only a few years and with very little benefit. The following publication, dealing with Le Blon's process, contained one colored and two black copperprints: *L'art d'imprimer les tableaux. Traité d'après les ecrits, les operations et les instructions verbales de J. C. Le Blon*, Paris, 1756, 8°.

Of anatomic plates which Le Blon produced by means of his invention only one print in oblong folio is known. It represents the male sexual organs in natural size and is printed on blue paper (therefore, perhaps only two other impressions, yellow and red, were employed). It has an exposition in Latin and French and bears the date 1721, but is without the artist's name. This print bears the title:

Préparation anatomique des parties de l'homme, servants à la generation, faites sur les decouvertes les plus modernes, 1721.

It is 10½ inches long and not quite 8 inches high and is contained in a medical book which was published repeatedly and was translated into both Latin and French: *William Cockburn: The symptoms, nature, cause and cure of gonorrhoea*, London, 1713, 8°, and later years. In Latin: *Ludg. Bat.* 1717, 12°; in French: *Paris*, 1730, 12°. From this it was inserted into one of the later editions or translations as an anatomic explanation of the seat of the disease.

Le Blon had been given an order from St. André, the body physician of the King of England, to furnish an anatomy in twelve sheets, but this order was not carried out. There is doubt regarding another print with which he is credited, representing the female sexual organs.

[With regard to Le Blon and his color copperplates, one should also consult Heinecken: *Idée générale d'une collection complètte d'éstampes, Leipsic et Vienne*, 1771, 8°, p. 210.]

JAN LADMIRAL

Jan Ladmiral (not l'Admiral), was born in 1698, of a good family of Normandy, and died at Amsterdam in July, 1773. He and his younger brother Jacob were pupils and assistants of Le Blon during his sojourn in London. But it seems that Ladmiral published the invention as entirely new and as his own, without ever mentioning Le Blon. Ladmiral offered his services in the making of colored anatomic representations to the famous anatomist Albinus in Leyden. This anatomist put his invention to a test and even permitted him to use two posthumous drawings by Ruysch. In this way, six representations of this kind were produced which were later published under the joint title: *Anatomische voorwerpen door Jan Ladmiral.* They are, in order, as follows:

Bernardi Siegfried Albini Dissert. de arteriis et venis intestinorum hominis. Adjecta icon coloribus distincta. Leid. Batav. apud Theod. Haak; Amstelaedami, ap. Jacob. Graal et Henr. de Leth, 1736, 4°; 5 leaves text and 1 plate in oblong 8°.

The print is preceded by Albinus' preface and treatise. In the former he says:

> Accidit quippe, ut egregius et industrius artifex Joannes Ladmiral ad me acederet offerretque se ad icones vivis coloribus distinctas efficiendas, quadam picturae compendiariae specie. Qua in re ut quid posset, experirer, curavi parandam iconem quam huic Dissertationi addidi, etc.
>
> "It happened that that excellent and industrious painter John Ladmiral came to me and offered his services for making pictures colored after life in a sort of short-hand kind of painting. To see what he could do in this line I have had a picture made which I have added to the dissertation."

In the treatise itself, no reproach of the artist is found, as Moehsen asserts; quite to the contrary, we read on page 6: *ipsos ramos incredibili se flectere varietate, quam icone expressit artifex, verbis vix possem,* "Words fail me to express the incredible variety of twisting of these branches, as the artist has rendered it in the plate." The picture represents a piece of the muscularis mucosae of the intestine in which the arteries are injected red, but the veins blue. The representations of the surface of the tunic as well as the injections, are very faithful and true to nature, even to the smallest detail. In the lower right-hand corner, in the green margin: *J. Ladmiral Fecit,* a signature which occurs also on all the other five plates to be mentioned. On all the plates explanatory letters are engraved.

Bernhardi Siegfried Albini Dissert. secunda. De sede et causa coloris Aethiopum et caeterorum hominum. Accedunt icones coloribus distinctae. Leid. Bat., apud Theod. Haak; Amstel., apud Jac. Graal et Henr. de Leth, 1737, 4°, 9 leaves text and 1 plate in oblong 8°.

The very detailed treatise on the color of the human skin is followed by the explanations of the representations in which is said:

Has idem ille Ladmiral, nec minore artificio, confecit, qui arteriarum et venarum intestini hominis, quam anno proxime superiore edidi. Is laudabili artis suae singularis specimina exhibendi studio incensus, non destitit me donec obtinuerit rogare ut opportunitatem darem, etc.

"These were made, and with no less workmanship, by that same Ladmiral who made the illustrations of the veins and arteries of the intestines of a man, (a work) which I published last year. From a burning and praiseworthy desire to show specimens of his matchless skill, he did not cease to entreat me until he prevailed upon me to give him a chance, etc."

The plate represents in three figures the skin and the nails of a negro woman.

Icon durae matris in concavà superficie visae, ex capite foetus humani octò circiter à conceptione mensium, desumtae, ad objectum artificiosissimè praeparatum a Cl. V. Fred. Ruyschio, delineata, et coloribus distincta typis impressa a Joanne Ladmiral. Amstelod., ap. Jac. Graal et Henr. de Leth; Ludg. Bat., ap. Theod. Haak, 1738, 4°, 2 leaves text and 1 plate in oblong 8°.

The text contains only the explanations of the plate in Latin, French, and Dutch; all identical. In this explanation the plate is described: *vivis coloribus non penicillo depicta sed inaudito et mirabili artificio typis impressa,* "in the colors of life, not painted with a brush, but printed from plates with a wonderful and unheard of ingenuity," while the French expresses the same idea in this manner: *imprimé à la Presse, au grand Etonnement d'un Chaqu'un.* The Dutch explanation reads only: *tot verwondering.* It is obvious that this designation originated with Ladmiral himself, who styles himself the editor. This plate ranks among the most beautiful of the entire series, both as regards the natural appearance of the whole and as to the very fine injections of the vessels which, on this plate, are only arteries and are therefore colored only in red. Of this plate and of the following plate, prints on blue paper had been made previously but with only Latin and Dutch explanations and without the date. These prints are said to have been done with less care. Friederich Ruysch, an anatomist who was especially famous for his fine injections, was born at The Hague, on March 23, 1638, lived in Amsterdam as a professor of anatomy and died there on February 22,

1731. His very rich anatomic collection was sold at Petersburg for 30,000 florins, but he soon collected a second one.

Icon durae matris in convexa superficie visae, ex capite, etc.—*a Joanne Ladmiral, Amstelod.*, etc.—1738, 4°, 2 leaves text and 1 plate of the same size as the preceding.

The title is the same as that of the preceding print, with exception of the beginning. The year, the place, and the publisher are also the same. The explanations are given in Latin, French, and Dutch and have a separate title: *Explicatio figurae cranii, serra divisi, periostio tecti, vitae speciem repraesentantis.* In the preface it is said that the print is *artificio eodem elaborata*, "wrought with the same artistry." This figure, too, is as faithful and as beautiful as the former. As regards an earlier impression of the plate the same is true as was said of the preceding.

Icon membranae vasculosae ad infima acetabuli ossium innominatorum positae, ex puero desumtae, ad objectum artificiosissimè praeparatum à Cl. V. Fred. Ruyschio, delineata, et coloribus distincta typis impressa à Joanne Ladmiral. Amstelod., etc.—1738, 4°, 2 leaves text and 1 plate in oblong 8°; the same publishers.

The explanations are in Latin, French, and Dutch; in these it is stated that the figure is *coloribus iisdem, quibus methodo Ruyschiana praeparata superbit, typis impressa*, "printed in the same colors which are the crowning feature of that prepared by the method of Ruysch." The figure is less beautiful and also less distinct and it is considered by some to be of an earlier date than the two representing the dura mater.

Effigies penis humani, injectà cerà praeparati exhibens inventa anatomica aliquot nova; et proprio colore typis impressa à Joanne Ladmiral. Leid. Bat., ap. Cornelium Haak, Amstelaed., ap. Jac. Graal et Henr. de Leth, 1741, 4°, 3 leaves text and 1 plate in 4°.

The text contains only the explanations in Latin, French, and Dutch. The picture is the largest of all the six, and of good workmanship. This print is said to be an imitation of Le Blon's on the same subject, mentioned before, but is supposedly inferior to it as regards vividness of color, beauty, distinctness, and naturalness of the impression (see Moehsen, page 147). Nothing, however, is said in the text about Le Blon or Cockburn. The last four small publications all have a vignette on their title-pages representing a skeleton, with glass receptacles containing preparations on a table in front of it and a genius behind it; all these are illuminated by a large sun. At the bottom on the left we read *Jan Ladmiral inv. et fecit.* The vignette is in black. The two works by Albinus have in place of the vignettes only a printer's mark.

JACQUES FABIAN GAUTIER D'AGOTY

Jacques Fabian Gautier d'Agoty, a maker of colored prints, was born at Marseilles, about 1717. He too was an assistant of Le Blon and after Le Blon's death, he obtained the latter's privilege on August 31, 1745. He died in 1786. He, also utterly disregarding Le Blon, claimed, like Ladmiral, to be the inventor or restorer of the colored copperprint, although he himself did nothing more than add a fourth black plate to the three colored plates used by Le Blon, and this addition, in the judgment of connoisseurs, did not improve his prints, as compared with the others. Since Gautier, in his own work, *Chroagenesie ou génération des couleurs. II. Tomes.* Paris, 1750, 1751, 8°, and in a second, more general work, *Nouveau systeme de l'univers*, attacked Newton's theory of colors, Goethe considered him important enough to devote to him an elaborate article in the historic part of his *Farbenlehre.* Here at the very beginning he is called "an active, quick, rather impulsive man, certainly gifted, but more than befittingly aggressive and sensational." His anatomic illustrations, while they may perhaps be fascinating to the layman, on account of their size and vivid execution, impress the critical observer with their arrogance and charlatanry and do not recommend themselves to the student of anatomy either for their faithfulness and reliability or for their technique. The latter is not suited for delicacy and exactitude but rather for large and massive representations. They are far inferior to Ladmiral's work, but they will always retain their value in the history of art and especially in the history of anatomic illustrations. They are as follows:

Essai d'anatomie en tableaux imprimés, qui répresentent au naturel tous les muscles de la Face, de Col, de la Tête, de la Langue et du Larinx, d'après les parties disséquées et préparées par L. Duverney, Maitre en Chirurgie à Paris, comprenant huit grandes planches dessinées, peintes, gravées et imprimées en couleur et grandeur naturelles par le Sieur Gautier, seul Privilégié du Roy dans le nouvel art, avec des tables, qui expliquent les planches, Paris, chez Gautier, 1745, large fol., 8 plates and text.

Suite de l'Essai d'anatomie en tableaux imprimés representans au naturel tous les Muscles du Pharinx, du Tronc et des Extremités supérieures et inférieures, d'après les parties dissequées et préparées par M. Duverney, etc. *comprenant douze grandes planches dessinées, peintes et gravées par*

le Sieur Gautier, seul Graveur privilégié du Roy dans le nouvel art, Paris, etc., 1745, large fol., 12 plates and text.

Myologie complètte en couleur et grandeur naturelle, composée de l'Essai et de la Suite de l'Essai d'anatomie en tableaux imprimés. Ouvrage unique, utile et nécessaire aux Etudians et amateurs de cette science. Paris, chez Gautier, Quillau père et fils et Lamesle, 1746, large fol., 20 plates and text.

The latter work is composed of the first two works. Of the three editions, this one is oftenest met with. It does not contain anything that has not already been given in the two other works, both as to the text and the plates.

Anatomie de la Tête en tableaux imprimés, qui représentent au naturel le Cerveau sous différentes coupes, la distribution des Vaisseaux dans toutes les parties de la Tête, les organes des Sens et une partie de la Nevrologie; d'après les pieces disséquées et préparées par M. Duverney, etc. *en huit grandes planches, dessinées, peintes, gravées et imprimées en couleur et grandeur naturelle, par le Sieur Gautier, seul Privilégié du Roy pour cet ouvrage; avec des tables relatives aux figures. Paris, chez Gautier, Duverney et Quillau,* 1748, large fol., 8 plates and text.

Anatomie générale des Viscères en situation, de grandeur et couleur naturelle, avec l'Angéologie et la Névrologie de chaque partie du corps humain. (*Paris 1752*) fol. maj.; 24 large plates.

From eighteen plates of this latter book, seven complete human figures can be put together, composed of either three or two plates each. The following four figures can be arranged from three plates each: a female body with vessels and muscles; a male body with the viscera, vessels, and muscles; a back view of a body with the nerves, muscles, and vessels; a skeleton with nerves and arteries. The following three figures can be put together by means of two plates each: a pregnant woman with the opened uterus; a male body with the muscles of face and arms, and the viscera; a skeleton with the mesentery, the diaphragm, and the vessels. The remaining six plates were not designed to be put together.

Exposition anatomique de la structure du Corps humain; en vingt planches, imprimées avec leur couleur naturelle, pour servir de supplément à celles qu'on a déjà données au public. Selon le nouvel art, dont M. Gautier, pensionnaire du Roi, est inventeur. Par le même auteur. 1759, Marseille, chez Vial; Paris, chez Le Roy; Amsterdam, chez Marc Michel Rey. De l'imprimerie d'Antoine Favet à Marseille, large fol., 20 plates and text.

Here, too, nine complete figures can be composed from every two plates, viz., a pregnant woman with abdomen and uterus cut open;

the profile of a female body; a male body with the blood vessels; a male body with the thoracic and abdominal viscera; the back views of two musclemen; three skeletons with representations for the study of the viscera and of neurology. Two plates are unconnected.

Anatomie des parties de la génération de l'homme, et de la femme, représentées avec leurs couleurs naturelles, selon le nouvel art, joints à l'Angéologie de tout le corps humain, et à ce qui concerne la grossesse et les accouchemens. Par M. Gautier Dagoty pére, Anatomiste pensionné du Roi. Paris, chez J. B. Brunet et Demonville, 1773, fol., 8 plates.

These eight plates can be put together into four figures: a male body, a female body, a pregnant woman, and a woman in labor. None of these figures are life-sized.

Exposition anatomique des maux vénériens sur les parties de l'homme et de la femme, et les remèdes les plus usités dans ces sortes de maladies. Par M. Gautier Dagoty, père, Anatomiste pensionné du Roi. Paris, chez J. B. Brunet et Demonville, 1773, fol., 4 plates.

Two plates represent the male genitals and two plates the female genitals afflicted with the diseases mentioned. The work is of very little value.

Exposition anatomique des organes de Sens, jointe à la Nevrologie entière du corps humain et conjectures sur l'électricité animale, avec des planches imprimées en couleurs naturelles, suivant le nouvel art. Par M. Dagoty père, anatomiste pensionné du Roi. Paris, chez Demonville, 1775, fol., 8 plates.

Three of the plates are designed to be composed into a neurologic figure. The other five represent: a cross-section of the skull and the organs of vision, the organs of hearing, the brain, the base of the skull, tongue and nose. The size of the plates is not the same throughout.

Exposition anatomique des organes des Sens, jointé, etc.—*animale et le siège de l'ame. Par M. Dagoty père, anatomiste, pensionné du Roi. Paris, chez Demonville, 1775,* fol. 9 plates.

Only the first one of the plates of the preceding edition is missing here. In its place we find a double plate representing perpendicular sections of two skulls, which, indeed are merely copies of the upper part of Plate 19 of the *Exposition anatomique de la structure du corps humain*, a representation of two horizontal cross-sections of the brain. Up to page 45, the text is absolutely identical with that of the preceding edition. On page 45 an explanation of the last three plates follows the original text. The above-mentioned edition should be given preference over the one discussed here since the two newly added plates are very poor and cannot replace the one omitted from the first edition.

Cours complet d'anatomie peint et gravé en couleurs par Arnaud Eloi Gautier d'Agoty, fils, expliqué par Jadelot, Nancy, 1773, large fol.

There is some doubt whether this work, begun by a son of Gautier, was ever finished. The statement, however, that the works on the sense organs discussed above were also edited by a son of Gautier is wrong. His father, who was then still living, is expressly named on the title-page as the sole author.

There is still another colored print by Gautier in large square folio representing the genitals of the well-renowned hermaphrodite Michel Anne Drouart. The main figure is a life-size representation of the abdomen from the umbilicus down to the middle of the upper part of the thigh. In the upper right-hand corner of the print a separate illustration of only the genitals is given, also in life-size. At the top of the print, toward the right, is engraved: *Demontré par M. Mentrude* (this should read Mertrud), at the bottom, to the left: *Peint et gravé par J. Gautier pensionnaire du Roy.*

Gautier edited three smaller prints in quarto representing the same hermaphrodite, whom Mertrud took for an actual hermaphrodite, while most of the other anatomists regarded him as a deformed man, and a few others took him to be a deformed woman. On one of these smaller prints the position of the main figure of the larger print is repeated, while the second one shows a front view of it. The plates are on page 50–52 of a journal edited by Gautier, which contained, among others, many color prints and also colored copper engravings. The title is:

Observations sur l'histoire naturelle, sur la physique et sur la peinture. Avec des planches imprimées en couleur. Paris, 1752–55, 4°, 6 volumes. Continued as: *Observations periodiques sur la physique, l'histoire naturelle et les beaux arts ou journal des sciences et des arts par Toussaint, avec des planches en couleurs par Gautier fils*, Paris, 1756, 1757, 4°, 3 volumes.

The copperplates published in this journal have been compiled and published under the following title: *Collection de planches d'histoire naturelle en couleur par Gautier*, Paris, 1757, 4°, 3 volumes. In this journal Gautier deals with the art of colored printing, I, 138; concerning which cf. Drouart, I, 61.

A colored print in folio after Gautier's method represents a child with the thoracic and abdominal cavities open. The order of the viscera is reversed from right to left. A short description is engraved upon the print and also the signature *Sue delineavit et Sculp.* This Sue can only refer to Jean Joseph Sue The Elder, who is generally called Sue de la Charité. He was born in 1710 and died in 1792. He was a surgeon and

anatomist, and an artist. He himself executed for anatomic demonstrations, a collection of one hundred and ninety-five drawings which his son, with the same Christian name and surname, increased to three hundred and sixty-four. The color prints are kept lighter in tone than Gautier's prints.

In Peter Tarin's *Adversaria anatomica de omnibus corporis humani partibus; Prima de cerebri nervorum—descriptionibus*, Paris, 1750, 4°, there are colored copperplates by a certain Robert, a pupil of Le Blon, who printed by means of two colors, red and black, using only two plates.

For color engravings and anatomic illustrations of this kind, see also the following works:

Van Gool (Johann): *De nieuwe schouburg der nederlantsche kunstchilders*, Gravenhage, 1750, 1751, 8°, I, 342–62.

De Laborde (Léon): *Histoire de la gravure en manière noir.* Paris, 1839, 8°, pp. 364–91.

Goethe: *Farbenlehre, historischer Theil;* in his works, LIV, 160–71.

Moehsen: *Bildn.* pp. 131–47.

Haller: II, 307, 387, 781.

Ebert: no. 8192–99.

Weigel: no. 3521, 22, 4924, 6815–17, 17932–34.

[In 1914, there were exhibited in Paris twelve unsigned painted panels which are attributed to Jacques Gautier d'Agoty. These panels, which measure approximately 92 inches in height by 27 inches in width, are doubtless the origins of some of the series of twenty plates which appeared in d'Agoty's *Myologie complètte en couleur et grandeur naturelle*, published in 1746. The technique and beauty of treatment of certain portions of the twelve panels indicate the hand of the finished artist, and oppose the suggestion that they were executed by d'Agoty's son Arnaud as illustrations for the medical works composed by the latter. These panels were placed on sale and were purchased by Burroughs Wellcome & Company of London.]

THREE OF TWELVE OIL PAINTED PANELS OF ANATOMICAL SUBJECTS ATTRIBUTED TO D'AGOTY

Each of these measures 2.30 meters in height by 0.70 meter in breadth. The delicacy and beauty of the women's faces show them to be the work of a finished painter. The twelve panels are now in the Wellcome Historical Medical Museum at London.

(After reproductions in the London Lancet, Feb. 21, 1914)

EDME BOUCHARDON

Edme Bouchardon, a sculptor and architect, was born at Chaumont, Bassigny, in 1698. He studied in Paris with Guilleaume Coustou The Younger and later for some time in Rome. After his return to Paris he became a member and a professor of the Academy of Paris. He died there in 1762. He was the author of:

L'anatomie nécessaire pour l'usage du dessein. Paris, chés J. Fr. Chereau, 1741, fol.—*Nouvelle édition*, Paris, 1802, fol., title and 16 leaves.

In it we find an allegoric copper-title with the preface engraved on the back, fourteen sheets of anatomic prints representing three skeletons, and eleven complete musclemen. In all, the drawing was done by Bouchardon, the engraving by Jacques Gabriel Huquier (b. Orleans, 1695, d. Paris, 1772). The latter also prepared the first edition of the book. Neither from an anatomic nor from an artistic point of view are the illustrations praiseworthy. The muscles, especially, are represented in that enervated, cadaverous condition which is the least suitable for the use of graphic or plastic artists. Everything indicates that unprofitable stage in artistic anatomy where Vesalian influence is weak or already extinguished, and where Albinian influence has not yet made itself felt. The drawing throughout is in the affected French style of the time.

[Bouchardon's portrait was engraved by Jacques Firmin Beauvarlet as a *Receptionsblatt* after a painting by François Hubert Drouais, Senior; cf. also J. Carnandet: *Notice historique sur Edme Bouchardon, suivie de quelques lettres de ce statuaire publiées pour la premiére fois d'après les originaux. Avec un portrait et un autographe*, Paris, 1855, 8°, of which only fifty copies were made. Cf. Weigel: *Kunstkatalog*, no. 18259, 20982.]

BERNHARD SIEGFRIED ALBINUS

Bernhard Siegfried Albinus was born at Frankfort on the Oder, February 24, 1697, and died at Leyden, September 9, 1770. He began his studies in Leyden and went to Paris in 1718 to continue them. Later he received a call to Leyden to lecture on anatomy and surgery during Rau's last illness, and, in 1721, was appointed professor of these sciences, to which, anatomy in particular, he devoted himself exclusively for fifty years.

He was the pioneer of a new epoch in human anatomy, an epoch during which all investigations, and especially those pertaining to osteology and myology, were carried out with the most perfect thoroughness and exactitude and with all the means then available.

Anatomic representation, too, enters upon an epoch of high perfection during which the mere outward appearance, superficial investigations, or the mere copying of subjects observed prove insufficient. Artistic and faithful representations of the true form and connection of anatomic structures, discovered through repeated comparative studies, are now demanded. What demands Albinus made upon himself in this respect and how he exerted all his energies toward the conscientious preparation for publication of his anatomic illustrations, can best be learned from the preface to the first volume of his *Annotationes academicae* and from a controversy between himself and Pieter Camper over the making of his illustrations. His reply to Camper's criticism, given in detail in the eighth volume of the *Annotationes academicae*, is also an exact description of the processes used by him and by the artist in the production of his illustrations. A person familiar with the methods and needs of the graphic and plastic arts, could from these two writings and also from the prefaces to all his larger illustrated works, furnish a detailed and most instructive treatise on the methods of anatomic illustration. Here a few suggestions must suffice:

Reddere non ad adspectum, qui mos est, sed ex mensura; reddere quod natura optima ostendit; reddere, non ut solent anatomici, sic solummodo sub adspectu pictoris ponendo, quod retexuerunt, sed ex aliis aliisque corporibus colligendo et in unum ad regulam componendo, sic ut veritas exhibeatur, etc. Ego sic existimo, quod natura fabricata est, noscere volentibus exhibendum sine depravatione, perspicue, remotis impedimentis et, quod fere caput rei sit, cum quodam judicio, inque tanta naturae varietate deligendam naturam optimam, etc. Satis non est, quamvis

aliquid sit, corpus diligenter rimari, ejusque compositionem retexere, instar fabri dissolventis cum cura aedem: sed quemadmodum architectus structuram penitus cognoscit, sic perspecta constructio corporis habenda. Satis non est, quaerere, investigare, notare, cognoscere, proferre ut eruere potueris: sed perspecta delectaque redigenda exhibendaque definite et distincte, etc. Laudo artem, quae plenius exprimat, planeque et dilucide. Fatentur, qui intelligunt, difficilem esse naturae imitationem: quo minus negligas, quibus imiteris melius. Laudo magis, quae elegantius exprimat, etc. (*Acad. annott.*, Lib. I, Praef., pp. 7, 11, 13, 14.) Neque icon ulla ex solo adspectu ducta est: omnes mensuratae sunt, aut ex intervallo infinito, architectorum more, quemadmodum pleraeque: aut ex intervallo quadraginta pedum per dioptras, quod infinito in his respondet, ut icones sceleti, in quibus deinde ut in fundamento musculi inscripti sunt, et ubi sceleti non sufficiebant, musculi mensurati sunt ex intervallo infinito, ac deinde aliquantum in se adductiores (verkürzt) redditi, ut poscebat distantia a centro. Ossicula autem auditus mensus est artifex parvo optimoque circino, cujus extrema acutissima erant, etc. Elegique quantum potui positum, ubi adductionis ratio minima sit, elegi, ut, quum vitari adductio nequeat, occurrerem imperitis, quos plurimos esse scivi, etc. (*Acad. annott.*, L. VIII., pp. 30, 50.)

"To reproduce, not free hand (according to the view), as is customary, but from actual measure: to reproduce what the best in nature displays: to reproduce, not as the demonstrators of anatomy generally do, by merely placing before the eyes of the artist what they have uncovered, but by collecting (data) from one body after another, and making a composite according to rule so that the actual truth will be displayed, etc. I am of this opinion, that what Nature, the arch workman, which is generally the source of everything, has fashioned must be sifted with care and judgment, and that in the endless variety of Nature the best elements must be selected. Then it does not suffice, though this, to be sure, is something, to search the body and reveal its composition like a carpenter dismantling a house with care, but just as the architect knows the structure through and through; in the same way we must thoroughly acquaint ourselves with the construction of the body. It is not sufficient to search, ferret out, take notes, become familiar with things and publish what you have been able to unearth in your delvings, but you must first know your material thoroughly and then exercise selection in reducing it and displaying it in a definite and clear manner. I have commendation for that art which expresses nature fully. Those who know admit that it is no easy task to imitate nature: the less you neglect this, the better you will serve the interests of those for whom you imitate. I have more commendation for that art which reproduces with discrimination, etc. (*Acad. annott.*)

"And not a single picture has been drawn free hand. All have been measured, brought down to scale, either from an indeterminate distance, as the architects do, a method which has been followed in most cases, or from a distance of forty feet through diopters which corresponds to an indeterminate distance in such cases, as for example, the pictures of the skeletons, upon which finally, as upon a ground plan, the muscles have been drawn in. Where the skeletons were not large enough the muscles have been measured from an indeterminate distance, and finally reproduced, somewhat shortened as the distance from the center required. The tiny bones of the ear the artist measured with a very small and perfect compass, the

points of which were particularly sharp. I have chosen, in so far as I was able, a position where the matter of shortening would be reduced to a minimum, in order that, since the shortening could not be altogether avoided, I might meet the needs of the inexperienced, who would, I knew, be many."

He, by the way, expended twenty-four thousand florins of his own money on his illustrations. (*Acad. annott.*, L. III, p. 73.)

Albinus' figures were drawn and engraved by Jan Wandelaer (b. Amsterdam 1690, d. Leyden 1759) who was a pupil of Folkema, Guiljam van der Gouwen and Gerard de Lairesse. He had done some work for the anatomists Friederich Ruysch and Arent Cant and began to work for Albinus in 1723. Albinus fully appreciated this artist's merits.

Is omnia et vere accurateque expressit et magna subtilitate artis. Expressit minima quaeque et, quod difficillimum est, ipsum, quantum forsan in hac arte, habitum. Eoque melius, quod idem pulchre et delineat et quod etiam majus est, imagines in aere ad res ipsas ducit. Has autem icones (ossium foetus) ad ipsa ossicula incidit. Qua propter non modo nihil ex imitatione deminutae sunt, ut deminui solent, quae ad delineatam formam inciduntur, sed longe etiam exquisitius imagines iis exprimuntur, quoniam delineare nemo potest, quae ad res ipsas talis artifex incidere, etc. Omniaque me duce expressit atque nihil nisi quod antea plane intellexisset, etc. (Preface to his *Icon. oss. foet.*, p. 3.)

"He has reproduced everything with truth and accuracy and with a marvelous refinement of skill. He has reproduced all the smallest details and what is most difficult, the very appearance, in so far as that art could. Still better is the fact that he draws beautifully and, what is even more important, draws the pictures on copper after the objects themselves. These pictures, moreover, of the bones of the embryo, he has cut after the little bones themselves. For this reason not only have the engravings not been reduced at all, as is the case with those that are cut after a picture, but these pictures are far finer than those, since none can sketch as well as such an artist can cut with the objects themselves for his model. He has reproduced everything under my guidance and nothing that he had not first thoroughly understood."

But most instructive on this point is Albinus' preface to the large work, *Tabulae sceleti*, etc., where he points out the ingenious contrivances used in the drawing of the skeletons and the musclemen. Two nets, as large as the skeleton itself, and divided into squares, were placed in front of the skeleton in such a way that one stood very close to it, and the other, with squares ten times as small, about four Rhenish feet away from the first. The artist, from his observation of the whole, placed himself at a distance of forty feet from the object. In order to see such parts of the whole as could not be discerned accurately enough at such a distance, he could come up to them as closely as he chose and owing to the net with the larger squares, which stood immediately in front of the skeleton, he was enabled to draw such details in proper propor-

tions to the whole. These contrivances, the details of which should be read in the passage cited above, had been suggested by 'sGravesande, professor of physics in Leyden. Albinus guided the artist in all his works:

Atque ita formandus a me ducendusque et plane regendus fuit, tanquam si ejus ministerio figuras ipse efficerem (Preface to *Tabulae sceleti*). Hoc scio, incredibilem operam a me insumtam, ut formarem duceremque, ad quam redire nolim nullo adducendus pretio, etc. Et si quis videat delineationes, praeter accuratam rerum definitionem neque umbras inveniat, neque quicquam cohaerens et absolutum; ut mirentur artifices, ad tam imperfectas delineationes tabulas efficere potuisse et quidem absque corporibus hominum: mirentur magis absque delineatione absoluta transferre in aes sic statim potuisse (*Acad. annott.*, L. VIII, p. 65).

"And so he had to be trained and guided and practically directed by me as if I were myself making the pictures, using him as a tool.

"I am aware that I took upon myself an incredible task of training and guidance, one that no amount of money would induce me to go back to. And if anyone should see the pictures, besides the accurate definition of things he would find no shadows and nothing coherent and complete, so that artists are astonished that he could have made the engravings after such unfinished pictures and that, too, without bodies: they would wonder more that without the finished picture he could work directly on the copper."

On the other hand, Albinus praised the artist most highly everywhere and defended him, especially against Pieter Camper who was prejudiced against him:

Cujus (sc. Wandelaarii) ego saepenumero miratus sum animum, patientiam, constantiam, qui alioquin acer, nunquam ab hyemali illa contentione (anatomic drawing in winter) discessit, nisi hebes redditus tardusque et languidus, plerumque etiam corpore aeger (*Acad. annott.*, L. I. Praef. p. 8).

"I have often wondered at his spirit, his patience, and his resolution; he is moreover ardent and never without a certain impetuous eagerness of effort."

With regard to the accessories to the first twelve plates of the *Tabulae sceleti et musc.*, which Camper had criticized, Albinus points out that the artist himself suggested them to improve the figures and that he did not by any means choose them arbitrarily as Vesalius and Bidloo had done.

Colore quodam circa figuras indigere se contendebat (Wandelaar) eumque colorem in res distinxit, quae parergon efficiant. Ob hanc praecipue caussam parerga adjecit, quae adeo non noceant figuris, ut eas potius juvent. Sic lumen figurarum se custoditurum contendebat: nam si spatium circum figuram interque partes earum album sit, lumen figurarum frangi. Sic effecturum, ut nihil durum sit, etc. Parerga in tabulis sceleti leviora esse, quam in tabulis musculorum, ut respondeant levitati sceleti, soliditati musculorum—leviora esse circum imagines, insigniora in locis distantioribus, ut res poscat (*Acad. annott.*, L. VIII, p. 17).

"He (Wandelaar) maintained that he required a certain color around the pictures and, to this end, he tinted the parts that make up the ornamental frame. It

was for this reason particularly that he added the ornaments, which, far from harming the pictures, are actually a help. He maintained that, in this way, he would preserve the proper light of the pictures, for if the space around the picture and between the parts should be white, the light of the pictures would suffer. He said that this means would insure that nothing would be harsh. The ornaments in the pictures of the skeleton are lighter than in the pictures of the muscles, corresponding to the lightness of the skeleton, the solidity of the muscles—they are lighter directly around the pictures and more conspicuous in the more distant places, as expediency demands."

That is why these figures, although composed of many separate parts, appear as a whole and seem to be stepping out of the picture, if you look at them through your hollow hand from a distance of three to five feet. This is especially true of the skeletons. With figures surrounded by blank spaces (as for instance Genga's, p. 254) the light is refracted and the shadows become harder so that the whole as such, and the details lack distinctness. (*Ibid.*, p. 18.)

Besides the works by Albinus which have been mentioned in the articles on Vesalius, Eustachius, and on the anatomic colored copperprint, mention should also be made of the following:

Historia musculorum hominis. Leid. Batav., apud Theodor. Haak et Henr. Mulhovium, 1734, 4°, 696 pp., including 8 plates in 4°.

The plates contained in this work were drawn and engraved by Wandelaer, as we learn from Albinus' preface. The plates themselves do not bear the name. They represent the hand of a man of particularly beautiful build, in life-size, with all the muscles, tendons, ligaments, and bones. There are four finished plates, each one accompanied by an outline-plate upon which the reference letters are engraved. Both the drawing and the engraving are done most excellently. The latter is slightly harder and colder than in the later works. The edition, *Editio altera notis aucta, Francof. et Lips., sumpt. Tob. Göbhardt*, 1784, 4°, contains inferior reprints of these eight plates in the original size.

Icones ossium foetus humani. Accedit osteogeniae brevis historia, Leid. Batav., apud Joh. et Herm. Verbeek, 1737, 4°; 4 and 164 pp. and 32 copperplates.

These plates are also engraved by Wandelaer. The illustrations were engraved upon the plates directly from the preparations. The first bears the signature: *J. Wandelaar omnes ad exemplaria in aes incidit.* The other plates are not signed. There are altogether sixteen finished plates, containing a total of one hundred and sixty-three representations. Each one of these plates is supplemented by an identical outline-plate containing the same figures with letters engraved upon them. The

different bones are reproduced with an unsurpassed fidelity and delicacy. The entire skeleton is missing. At the end of his preface, Albinus promises to see to it that only good prints are published and that the plates are not given away to anybody, to prevent the making of inferior prints for the sake of pecuniary gain.

Tabulae sceleti et musculorum corporis humani. Lugd. Batav., ap. Jo. et Hermann. Verbeek, 1747, large fol., 6 and 41 printed leaves, 40 copperplates.

All the plates are drawn and engraved by Wandelaer as the signature on each one of them indicates. The first three plates are finished representations of the skeleton and are each accompanied by an outline-plate of the same size. The following nine plates represent complete finished musclemen; each one is again given an additional outline-plate. The fourteen plates following these nine represent special muscles and parts of muscles. Each one of the very numerous figures on each plate is supplied with an outline-drawing unless the letters are engraved directly upon the finished figures. The skeleton plates are numbered 1–3 and are all double, the myologic plates are numbered 1–25 of which the first nine are double. This would give altogether twenty-eight plates with the first twelve double, or a total of forty copperplates. Ebert, no. 360, should be corrected accordingly. The first twelve plates, representing entire skeletons and musclemen, are provided with elaborate accessory work. The title contains a vignette by Wandelaer. This book is Albinus' principal work.

Tabulae VII. uteri mulieris gravidae cum jam parturiret mortuae, Lugd. Bat., ap. J. et H. Verbeek, 1748, large fol., 7 copperplates.

Tabularum uteri mulieris gravidae appendix T. I.; ibid., 1751, large fol., 1 leaf; together 8 leaves with engraved explanations.

These present on seven plates in life-size the uterus, far advanced in pregnancy, and the fetus, and on an eighth plate the fetus alone. They are both without any printed text.

Tabulae ossium humanorum. Leidae, apud J. et H. Verbeek, 1753, large fol., 70 copperplates.

Two of the seventy copperplates contain the title and the preface. The remaining plates are thirty-four finished coppers and the thirty-four corresponding outline-plates with letters and explanatory text. On the first plate is engraved: *J. Wandelaar omnes in aes ad ossa ipsa incidit*, 1727 *et seq.* This book is a continuation of the *Tabulae sceleti* and contains life-sized representations of all the different bones of the adult human being, done with the usual exactitude.

Tabula vasis chyliferi cum vena azyga, arteriis intercostalibus aliisque vicinis partibus, Lugd. Bat., apud J. et H. Verbeek, 1757, large fol., 1 copperplate and 1 leaf of text.

This is a life-sized representation of the thoracic duct in its entire course and consists of one main figure and three subordinate figures which were all directly drawn and engraved upon the plate by Wandelaer. Besides the accompanying text, explanations may also be found in *Acad. annott.*, L. IV, p. 38 *et seq.*

Academicarum annotationum libri I–VIII. Leid., apud J. et H. Verbeek, 1754–68, 4°, 2 volumes with 37 copperplates.

This is a miscellaneous treatise pertaining to anatomy, physiology, natural science, surgery, etc. On some of the plates, twenty-eight of which belong to the first and nine to the second volume, Wandelaer's name is given.

Engraved copies of Albinus' plates can be found in Pierre Tarin's *Ostéographie,* Paris, 1753, 4°, and his *Myographie,* Paris, 1753, 4°. Others representing three skeletons and three musclemen may be found in John Brisbane's *Anatomy of painting,* London, 1769, fol. Imitations turn up in many of the later works on scientific and artistic anatomy.

Jacob Houbraken and Johann Jacob Haid engraved a portrait of Albinus in copper, after a painting by the younger Karel de Moor. Original drawings done by Wandelaer for Albinus are in the possession of the Medico-Chirurgical Academy of Dresden.

Van Gool (Johann): *De nieuwe schouburg der nederlantsche kunstschilders,* Gravenhage, 1750–51, 8°, II, 169–78.

Moehsen: *Bildn.*, p. 124.

Haller: II, 126.

Ebert: no. 359–65.

PIETER CAMPER

Pieter Camper, physician, anatomist, and naturalist, was born at Leyden, May 11, 1722, and died at The Hague, April 7, 1789. Initiated into the domain of the graphic and plastic arts at an early age by the elder and the younger Karel de Moor, he studied medicine at the University of Leyden and obtained his doctor's degree in 1746. In 1748, while on a journey through England, France, Switzerland, and Germany, he was offered the professorship of anatomy and surgery at the University of Franecker. He took this position in 1750. In 1752, he was in London and here he made the drawings for several plates for Smellie's *Set of anatomical tables*, dealing with obstetrics. In 1755, he was appointed to the professorship of anatomy and surgery at the Athenaeum of Amsterdam; with this he combined the professorship of medicine in 1758. But very soon after, in 1761, he resigned from these positions and withdrew to his villa at Klein-Lankum near Franecker. In 1763, however, he became professor of anatomy, surgery, and botany at the University of Gröningen, and these positions he held until 1773, when he retired to live in Franecker. In 1776 he was in Paris, in 1779 he traveled through a part of Germany, staying especially in Hamburg, Hanover, and Göttingen, and in 1780, in Berlin. In 1785 he made a second journey to England and in 1787 was again in Paris. Later, he lived in The Hague and, as a member of the Council of States, was obliged to spend the remainder of his life there.

We have from his pen a very large number of smaller articles on the most widely differing subjects of medical science, such as anatomy, surgery, obstetrics, medical jurisprudence, veterinary surgery, zoötomy, and natural history. Among them are ten crowned prize essays. He made attempts also in various branches of the graphic and plastic arts. Very early he had done oil painting and had turned out a great many drawings in India ink and charcoal. Later he tried his skill also at pastel painting, etching, and mezzotint. At the age of fifty he took instruction from Ziesenis in sculpture and made a marble copy, after Quesnoi, of the head of a child. He also lectured on the graphic and plastic arts and on artistic anatomy at the Athenaeum in Amsterdam and is even said to have studied the theories of architecture, of which assertion proof is repeatedly given in his treatise on the beauty of form (*Het Gedaanteschoon*).

In particular he made many anatomic drawings which are, therefore, often found in collections. They are all graceful and bold in design and, by sparing use of cross-strokes, are characteristically crosshatched. Especial attention has been paid to a careful differentiation of the tissues.

Of his many writings, only the following concern us:

Dissert. inauguralis de visu, Leiden, 1746, 4°.—*Diss. inaug. altera de nonnullis oculi partibus*, Leiden, 1746, 4°.

The second of these writings, which has also been inserted in Haller's *Disputationes selectae*, contains, among other illustrations, a fine representation of the canal of Petit at the equator of the lens capsule.

Demonstrationum anatomico-pathologicarum liber primus, continens brachii humani fabricam et morbos. Amstelaedami, apud Joann. Schreuder et Petr. Mortier jun., 1760, large fol.; 6 and 22 pp. and 3 copperplates.—*Liber secundus, continens pelvis humanae fabricam et morbos, Amstel., ap. eosdem*, 1762, large fol., 6 and 24 pp. and 5 copperplates.

This is Camper's larger work and is particularly valuable. Treating, however, mainly of anatomic, pathologic, and surgical matters, it is of only partial interest to our discussion. These two books, which were not followed by any continuation, contain five finished coppers of which the first, the third, and the fourth are supplemented by a linear plate with references and letters. The fifth plate has a few outline figures besides the finished representations. All the representations were drawn by Camper himself and were engraved by Jacob van der Schley (born at Amsterdam in 1715, died there in 1779). The representations are nearly life-size and were designed for the practical use of surgeons. A third book had been planned to contain a representation of the base of the brain and the origins of the nerves, but was never published.

Epistola ad anatomicorum principem, magnum Albinum. Groningae, 1767, 4°.

This is the letter which caused the rather bitter controversy which we had occasion to mention in the article on Albinus. Camper held the opinion, previously expressed in his preface to the above-mentioned work, that anatomic subjects should not be represented in perspective but architecturally, i.e., they should not be drawn as seen from one point of view, but as if the perpendicular visual axis struck each single part of the subject from the same distance. The plates by Vesalius, Eustachius, Cheselden, Albinus, and Haller, were all perspective representations, in contrast with this view.

Verhandeling over het naturlijk verschil der wezenstrekken in Menschen van onderscheidene Landaart en Ouderdom, over het Schoon in antijke beelden en gesneedene Steenen, gevolgd door een voorstel van eene nieuwe manier om hoofden van allerleije menschen med zekerheid te tekenen. Na des Schrijvers Dood uitgegeven door zijnen zoon Adrian Gilles Camper, Utrecht, bij Wild en Altheer, 1791, 4°.—French by Denis Bernard Quatremere d'Isjonval, Utrecht, chez les mèmes, 1791, 4°.—German by Samuel Thomas Soemmerring, Berlin, Voss, 1792, 4°, with 10 copperplates.

This work deals with the difference in the features of people of different countries and of different ages, and with the beauty of classic sculptures and cameos. It contains also the suggestions of a new way of drawing to assure success in representing the heads of all kinds of people and was first planned by Pieter Camper in 1768. In 1772 he made certain additions and, in 1786, completed it, in the form in which his son published it. But the chapter on the characteristics and the character of classic statues, coins, and cameos is missing; and the markings and explanations of the figures on the last nine plates had to be added by another person. This small publication, nevertheless, contains the most valuable investigations on the mathematical structure of the human head (on cephalometry) and, of all his writings, was most instrumental in making Camper's name famous, since Camper's so-called facial line, or, more correctly, facial angle, was described for the first time in this book. The book also contains ten copperplates, drawn by Camper and engraved by Reinier Vinkeles, all in outline without cross-hatching. The French translation contains copies from the original plates. The German translation has prints from plates faithfully re-engraved by Daniel Berger. In this latter translation are also several annotations by Soemmerring. Camper's preface on his studies of the graphic and plastic arts is very instructive.

Redevoeringen over de wijze om de verscheidene hartstogten op onze wezens te verbeelden; over de verbaazende overeenkomst tusschen de vier-voetige dieren, de vogelen, de visschen en den mensch; en over het gedaante-schoon. Gehouden in de Teken-Academie te Amsterdam. Uitgegeven door zijnen zoon A. G. Camper, Utrecht, bij Wild en Altheer, 1792, 4°.—French, Utrecht, 1792, 4°.—German by G. Schaz, Berlin, Voss, 1793, 4°, with 11 copperplates.

These lectures on the methods of representing the different passions in the human face; on the astounding similarity between quadrupeds, birds, fish, and man, and on the beauty of form, were given at the

Academy of Graphic and Plastic Arts in Amsterdam, in 1774, 1778, and 1782. Only incomplete fragments of the same, with a number of sketches, were found after Camper's death. From these fragments the text for this edition was compiled and was then provided with explanatory outline drawings. The original Dutch edition contains also a portrait of Camper by Reinier Vinkeles. These same lectures may also be found in French, supplemented by illustrations, in the third volume (pages 297–421) of the following work:

Œuvres de P. Camper, qui ont pour objet l'histoire naturelle, la physiologie et l'anatomie comparée. Vols. I–III. Paris, chez H. J. Jansen, 1803, 8°.—*Planches pour les œuvres de P. C., qui ont pour objet,* etc. Paris, 1803, fol.

The atlas contains an engraved portrait of Camper done in stipple by Barthélemy Roger and thirty-four copperplates in folio engraved by Euphrasie Picquenot, by Reinier Vinkeles, and by others whose names are not given.

In the following collections none of Camper's works mentioned heretofore is given.

Peter Campers Sämmtliche kleinere Schriften die Arzney-Wundarzneykunst und Naturgeschichte betreffend. Mit vielen neuen Zusätzen und Vermehrungen des Verfassers bereichert von J. F. M. Herbell; Vols. I–III, Leipzig. S. L. Crusius, 1784–90. 8° with copperplates.

Petri Camperi Dissertationes decem, quibus ab illustribus Europae, praecipue Galliae, academiis palma adjudicata. Cum tabulis in aere expressis. (Edid. J. F. M. Herbell.) Vol. I, II, Lingae, sumtibus F. A. Jülicher, 1798–1800. 8°.

Two fine osteologic sheets (representing in several figures a diseased bone of a child, the skull seen from below, and the foot) drawn by Camper and engraved by Reinier Vinkeles, born in Amsterdam in 1741, may be found in J. F. Blumenbach's *Geschichte und Beschreibung der Knochen,* Göttingen, 1786, 8°. They were engraved in 1780.

Eight years before his death, Camper himself edited a list of his writings published up to that time under the title:

Historiae litterariae cultoribus S. P. D. Petrus Camper, Harlingen, 1779, 4°, 8 pp.

A biography of Camper was written by his son Adrian Gilles Camper in Dutch, an abstract of which may be found in the translation of the work on the passions prepared for publication by Schaz. A biography in French may be found in *Œuvres qui ont pour objet,* etc., Vol. I, which

also has the two *Eloges* written by Vicq d'Azyr and Condorcet. An abstract of these biographies is given in

Roeland van Eynden en Ad. van der Willigen: Geschiedenis der vaterlandsche Schilderkunst sedert de helft der XVIII Eeuw., Haarlem, 1816–40, 8°, I, 163; with portrait.

Stephen Maurice Falconet made a bust of Camper in marble. Reinier Vinkeles (1741–1816) drew and engraved his portrait. The other portrait of Camper by Roger has already been mentioned.

Haller: II, 395, 781.
Ebert: no. 3424–31.
Weigel: no. 3599, 8454, 18260–62.

ALBRECHT VON HALLER

Albrecht von Haller, botanist, anatomist, and physiologist, became the founder of a new epoch in these sciences through his many very exact investigations in nature and through his numerous works of lasting value. He was a man of untiring diligence and admirable sagacity, great and unequaled in all that he undertook. He was born at Berne, October 16, 1708. His first teacher in anatomy was J. G. Duvernoi at Tübingen. Later instructors were Boerhaave and Albinus in Leyden, James Douglas in London, Winslow in Paris, and others. In 1736, he became professor at Göttingen. On account of his poor health he reluctantly resigned this position in 1753, and went to Berne, where he became magistrate, holding this position until his death, December 12, 1777.

With the many scientific corrections which Haller was able to present to anatomists, owing to his exact investigations and to his studies under Albinus, he was bound to make pictorial representations of anatomic preparations the main object of his care. His illustrations are therefore very numerous. They are very clear, vivid, highly exact, and artistic. The greater part of them had been scattered through his many writings and these were later collected by Haller himself under the title:

Opera minora anatomici argumenti, emendata, aucta et renovata, Vols. I–III, Lausanne, 1762, 1766, 1768, 4°, with copperplates.
Haller himself esteemed this work and his *Icones*, discussed farther on, as among his best productions.

Above all, however, mention should be made of a collection expressly emphasizing perfect pictorial representation of anatomic subjects, a collection which Haller prepared during his best days of activity, aided by competent artists, viz.:

Icones anatomicae, quibus praecipuae aliquae partes corporis humani delineatae proponuntur et arteriarum potissimum historia continetur, Gottingae, apud vid. B. Abrami Vandenhoeck, 1756, large fol., with 47 copperplates.

The book was begun in 1743 when the first *Fasciculus* was published. This was followed by seven others in 1745, 1747, 1749, 1752, 1753, 1754, and 1756. In 1756 the above-quoted common title was given to the whole. The last four plates of the work, representing the arterial system of the whole body and consisting of two finished and two outline

plates, are twice as large as the others. The engraving of all the plates is strikingly clear and done with the graver. C. J. Rollinus, doctor of medicine, is named as the artist who drew the plates in the first books. As the artist of the other plates Joel Paul Kaltenhofer (d. 1777) is given; he also engraved most of them. The other engravers are George Daniel Heumann, court and university engraver at Göttingen (1691–1759), Jacob van der Spyk of Leyden, J. C. Schrader of Göttingen, Michael Rössler of Nuremberg, J. C. G. Fritzsch of Hamburg, and Carl Sepp of Amsterdam. The order of the subjects is purely accidental, depending upon the author's occasional necessities of making some accurate dissections of certain organs. Besides the general views of the system of the arteries of the whole body, as given in the last four plates, various other plates represent on a larger scale almost all the arteries of special sites and organs, on a larger scale, with the surrounding parts. Then there will further be found special representations of the diaphragm, the spinal cord, the uterus and its appendages, the omentum, the base of the skull, and the heart. This work will always remain the main source of information for accurate anatomic studies, especially of the arteries and the viscera.

But in still another respect, Haller has become important. Thanks to his habit of reading much and reading accurately, and of taking notes on the value and the contents of every book he read, a supply of literary resources accumulated which, known as the *Bibliothecae* of Haller, comprise ten stout quarto volumes. Three of these *Bibliothecae*, those on botany, anatomy, and surgery, he compiled himself during his later years. The fourth, on internal medicine, was finished after his death. They contain the most exhaustive and most thorough information on the writings of all times and all nations in these fields, including also the older manuscripts and articles pertaining to these subjects, found in collections and periodicals, all of them treated with astonishing completeness. The best among these works are those on botany and anatomy, the subjects in which Haller himself accomplished so much. One of the chief sources of historic information in connection with our discussion was his

Bibliotheca anatomica, qua scripta ad anatomen et physiologiam facientia a rerum initiis recensentur, Vols. I, II, Tiguri, 1774, 1776, 4°.

The second volume of the *Bibliotheca anatomica* was later given another title with the year 1777 in order to further its sales. On this latter title it is said that the book enumerates all the books published up to 1776. But as to the latter year, this assertion is only partially true.

The title cited is the more correct one. This considers all the publications up to 1774. Such editions as the author himself had looked at he marked with an asterisk. *Non omnia certe vidit ipse in labore immenso viresque superante mortales, quae dixit ea studuit vera fide dicere.* ("He has assuredly not seen everything in a labor so immense and too great for human strength, but what he has told he strove to tell accurately"), he says himself of this work (II, 216) where he gives a description of his life, as far as it influenced anatomy. This work is therefore important also for the history of pictorial representations, although the history of art is not taken into consideration.

Blumenbach: *Introductio*, pp. 383 *et seq.;* also his *Medicinische Bibliothek*, II, 1, pp. 179 *et seq.*

Ebert: no. 9204–21.

JOHN BRISBANE

John Brisbane, doctor of medicine, was dissatisfied with the way in which anatomy was taught, and asked particularly for a short elegant manual of anatomy, with good drawings, for the use of the graphic or plastic artist and for the general information of the layman. He himself never dared to attempt such a book, but suggested that a scholarly anatomist, a man of good judgment and a highly cultivated mind undertake this task. He sets up as models: Celsus *De medicina* iv. 1; vii. 7, 18; viii. 1, and the description of the human organization by Cicero in his *de natura deorum*, Lib. ii. He maintains that the artist has to study anatomy differently from the physician and the surgeon, namely from the point of view of his own art: "for tho' physicians and surgeons have, for a long time, in a manner engrossed the whole business of teaching anatomy, yet painters, statuaries and engravers, should assert their rights, and teach and write upon this science in a picturesque manner, suited to their own art," etc. He also thinks that more than is commonly believed can be accomplished by means of good illustrations, indeed he even holds that good illustrations may often serve the purposes of the artist better than personal dissection. He also presents Albinus' plates on a smaller scale as models, and, translating Albinus' own words, he describes Albinus' method of procedure. Out of these attempts grew the very rare, somewhat curious, but clever and highly instructive work under the following title:

The anatomy of painting, or a short and easy introduction to anatomy; being a new edition, on a smaller scale, of six tables of Albinus, with their linear figures; also, a new translation of Albinus's history of that work, and of his index to the six tables; to which are added the anatomy of Celsus, with notes, and the physiology of Cicero; with an introduction, giving a short view of picturesque anatomy. London, printed by George Scott, and sold by T. Cadell, 1769, fol.; 22 and 76 pp. and 12 copperplates in fol.; between pp. 58 and 59 there is yet another unaccounted title.

The plates represent three skeletons and three musclemen done on a small scale after Albinus and are all accompanied by outline-plates, on which special parts are repeated on a large scale in subordinate figures. The outline-plates are marked with engraved letters for explanation. The plates are praiseworthy, both from an artistic and an anatomic

point of view. Each finished print is signed, at the bottom to the left: *J. Brisbane M. D. delin. direxit editit.* On the first plate, in the lower right-hand corner, P. Benazech is named as engraver (probably Peter Paul Benazech, b. 1774). For the other plates J. Caldwell is given as the engraver (James Caldwell, b. 1739). The text contains a preface and an introduction, an English translation of Albinus' preface to his *Tabulae sceleti et musculor.*, an explanation of the plates, and lastly, under a separate title, the translations of the above-mentioned passages from Celsus and Cicero. A commentary is added to the former.

Haller: II, 662.
Weigel: no. 17766.

ERCOLE LELLI

Ercole Lelli, painter, engraver, stamp-cutter, and modeler in wax, was born at Bologna in 1702, and died there in 1766. The anatomy of man, as far as it concerns the artist, was the object of his particular study. By order of Benedict XIV, he made for the Institute of Bologna an anatomic statuette for the use of graphic and plastic artists. Another statuette of his was regarded as a canon even at foreign schools. The Abbate Farsetti in Venice possessed the smaller original of this latter statuette. Lelli gave instruction in such anatomy as artists needed and later became director of the academy in Bologna.

Anatomia esterna del corpo umano, per uso de' pittori e scultori, delineata ed incisa da Ercole Lelli, con la denotazione delle parti trata da' manoscritti del medesimo. S. l. et a. fol., 6 leaves.

This was probably published after his death and contains five etched copperplates, representing musclemen, all marked with letters and numbers for which explanations are always given on the opposite page. The engraving is poor; the drawing is done in the style of the Caracci. [On Ercole Lelli and anatomic plastic art, cf. Mich. Medici: *Della vita e degli scritti degli anatomici e medici fioriti in Bologna dal cominciamento del secolo XVIII. fino al presente*, Bologna, 1853, 4° (*discorso I*, p. 21).]

Weigel: no. 17778.

MICHEL FRANÇOIS D'ANDRÉ BARDON

Michel François d'André Bardon, usually called Dandré Bardon, was a painter and etcher, and a pupil of Charles André Vanloo, whose biography he wrote. Bardon was born at Aix in Provence in 1700. He became a member of the Academy in Paris in 1737, and later director of the Academy in Marseilles, but he lived in Paris and died there in 1783. Besides being the author of many writings on the theory and history of the graphic and plastic arts, he also published

Traité d'anatomie à l'usage des jeunes peintres, Paris, 1770 (1783), fol.

LAMBERT SIGISBERT ADAM

Lambert Sigisbert Adam, sculptor, was born at Nancy in 1700. After receiving a prize in Paris he studied for ten years in Rome. He then returned to Paris and, in 1737, became a member of the Academy. He died at Paris in 1759. He was the author of

Planches anatomiques, dessinées et gravées par Adam l'ainé, sculpteur du Roy, corrigées, augmentées, reduittes dans la dernière exactitude et de plus enrichies de descriptions et de lettres d'indications désignans les différentes parties; par les soins de F. M. Disdier, maitre et professeur en chirurgie, etc. *Ouvrage très utile pour les peintres et sculpteurs et principalement pour les commençans, Paris, chez J. B. Crepy,* 1773, fol.; 15 plates printed on one side, in oblong folio.

The work is composed of an allegoric copper-title, six osteologic copperplates with the explanations engraved on the opposite pages, and two myologic plates without explanations. The title is without address. The first osteologic plate is signed: *Suite de Squelets dessiné par L. S. Adam Lainé Sculpteur du Roy;* the following five osteologic plates are signed: *Dessiné par L. S. Adam, Sculpteur du Roy;* the last two plates show an altogether different technique and are signed *JCF* (a monogram) *f. et ecc. C. P. R.*, meaning probably *cum privilegio regis.* Adam's plates do not represent complete skeletons, but only skulls, the bones of the forearm and the hand, and the bones of the tibia and the foot. The last two plates are pictures of musclemen with the skeletons drawn inside of them and are, of course, on a smaller scale. On the first plate only one body is represented, on the second plate a group of five bodies in different positions is shown. All nine plates are done in red crayon. The anatomy is praiseworthy. The commentator, François Michel Disdier (b. Grenoble 1708, d. Paris 1781), was professor of surgery and also drawing master at the Academy of Painting in Paris.

WILLIAM HUNTER

William Hunter, physician and obstetrician of London, was born at Kilbridge, Scotland, in May, 1718, and died at London in March, 1783. He was chiefly interested in anatomy, and as a teacher of this science, he founded, with his own means, an institution for the advancement of that subject and in connection with it formed a large anatomic collection. Of his works, the following may be discussed here:

Anatomia uteri humani gravidi tabulis illustrata, auctore Gulielmo Hunter. The anatomy of the human gravid uterus exhibited in figures, by William Hunter, Birminghamiae, excudeb. Joannes Baskerville, 1774, large fol.; 3 preliminary leaves and 17 leaves text, 34 copperplates.

These thirty-four copperplates represent the gravid uterus and its contents in life-size, anatomically exact, and artistically perfect. The text is written in Latin and English in two opposite columns and contains only the anatomic explanations of the plates. The work was begun in 1751 and was originally planned to comprise ten, afterward thirty-six plates. Two plates that had been engraved before were discarded, and thirty-four were published. Plate XVI was drawn by Edward Edwards; Plate XXI by Alexander Cozens; Plate XXII by Blakey; all the other plates by I. W. Rymsdyk. The engraver of Plates I and VII was François Simon Ravenet; of Plates II and IX, Louis Gérard Scotin; of Plate III, Thomas Major; of Plates IV and VI, Robert Strange; of Plate V, Johann Sebastian Müller; of Plate VIII, Charles Grignion; of Plates X, XXVII, XXIX, XXX, Pierre Charles Canot; of Plate XI, Pierre Maleuve (probably Maleuvre); of Plate XII, J. Mitchel; of Plate XIII, Mechel; of Plates XIV, XVIII, XXIII, XXIV, XXV, XXVIII, XXXI, Menil (on Plate XXV the name signed is Manil); of Plates XV, XXI, XXII, XXVI, François Aliamet; of Plate XVI, Michell; of Plate XIX, J. Fougeron; of Plate XX, Henry Bryer; of Plate XXXII, I. W. Rymsdyk; of Plate XXXIII, Thomas Worlidge; of Plate XXXIV, George Powle. In the preface the author praises his brother John Hunter for his assistance in the anatomic examinations, and mentions the men who made the drawings for his plates, also the engravers, particularly the famous Robert Strange (1723–92). These are his words:

He owes likewise much to the ingenious artists who made the drawings and engravings; and particularly to Mr. Strange, not only for having by his hand secured a sort of immortality to two of the plates, but for having given his advice and assistance in every part with a steady and disinterested friendship.

Rudolph Weigel in *Ch. Leblanc: Le graveur en taille douce No. II.* (*Catalogue de l'œuvre de Robt. Strange*), Leipsic, 1848, 8°. p. xv, described the two plates by Strange and mentioned there also that, in 1784, the London bookseller J. Johnson offered for sale simply the proofsheets at three and one-half guineas, while they originally cost six. A new edition with impressions from the well-preserved original plates was published in London, by Edward Lumey, s. a. (1815), large folio. Caldani's *Icones anatomicae*, Vol. III, contains the plates entirely re-engraved in the original size.

The text of this work has been enriched by Matthew Baillie, a nephew of the author, with posthumous manuscripts of William Hunter, and has thus been separately published under the title: *William Hunter's Anatomical description of the human gravid uterus and its contents*, London, 1794, 4°. Edited by Edw. Rigby, London, 1843, 8°. In German by L. F. von Froriep, Weimar, 1802, 8°.

[The original plates for Hunter's work on the pregnant uterus were acquired by the Sydenham Society, founded in London in 1843 and dissolved in 1857. From these originals, this society had an edition prepared, not for the book-trade, but for its members only, containing the complete Latin and English text, under the title of the original work. In place of the name of the older firm the title-page read: *London: printed for the Sydenham Society, 1851.* Preceding the title on a separate page are the words: *The Sydenham Society instituted MDCCCXLIII*, with a bust of Sydenham underneath as the printer's mark. The text is separate from the plates and begins directly after the preface. The plates are lithographic facsimiles of the originals, transferred upon stone by a mechanical process in such a way as to reproduce every stroke of the cross-hatching and of the contour in the original size. The numbers of the plates in the upper right-hand corner, the signature, and the names of the artists are lithographed in script. At the bottom are the words: *London, Printed by Day and Son*, which are omitted from some plates.— With reference to the original see Weigel: *Kunstkatalog no.* 19320.]

Haller: II, 364.

Von Siebold (Eduard Caspar Jacob): Geschichte der Geburtshülfe, Berlin, 1839–45, 8°, II, 358, Sec. 133.

Ebert: no. 10390.

Weigel: no. 17946.

ANTONIO SCARPA

Antonio Scarpa, surgeon and anatomist, was born June 13, 1747, at Motta in the march of Treviso, and died October 31, 1832, at Pavia. He received instruction in anatomy from Morgagni at Padua and instruction in surgery from Riviera at Bologna. He became professor of these two sciences at Modena. He made a rather extended scientific journey through France and England and later also, in the company of Alessandro Volta, through Germany. In 1783 he became professor of anatomy in Pavia, and later took charge also of the surgical clinic from which he resigned in his declining years.

Scarpa was one of the most excellent men of his day, inventive, and of untiring diligence. Finer anatomy, especially the anatomy of the nerves and operative surgery, owes to him most vital advancements. He was besides an admirable artist and had studied representation of anatomic subjects in wax under Professor Calza. He himself trained the famous Faustino Anderloni to become the engraver of his illustrations. The latter's brother, Pietro Anderloni, assisted Faustino in the beginning. His anatomic prints are therefore models of anatomic representation as regards faithful differentiation of the tissues, correctness of form, and the utmost perfection of engraving. They rank with Soemmerring's illustrations and even surpass them in respect of the vigor of the engravings.

Leaving out of consideration the numerous surgical works by Scarpa, the following anatomic works may be mentioned:

De structura fenestrae rotundae auris, et de tympano secundario anatomicae observationes, Mutinae, apud societatem typographicam, 1772, 8°, with figures.

This has two copperplates in quarto, drawn and engraved by Antonio Butafogo in Padua. The second plate is zoötomic. This small publication contains exhaustive historic and anatomic investigations on the subject. Scarpa was then professor of anatomy and surgery at Modena.

Anatomicarum annotationum liber primus, de nervorum gangliis et plexubus. Mutinae, typis haeredum Barthol. Soliani, 1779, 4°, with figures.—*Editio altera, Ticini regii et Mediolani, apud Joseph. Galeatium,* 1792, 4°, with figures.

This contains two copperplates in large quarto folio, being the same in both editions and representing the distribution of nerve fibers in the

ganglia and the plexus, made perceptible by means of maceration in water. They are drawn by Scarpa (see his Preface) and engraved by Domenico Cagnoni of Milan.

Anatomicarum annotationum liber secundus, de organo olfactus praecipuo deque nervis nasalibus interioribus e pari quinto nervorum cerebri. Ticini regii, typis monasterii S. Salvatoris, 1785, 4°, with figures.—*Editio altera, Ticini regii et Mediol., ap. Jos. Galeatium,* 1792, 4°, with figures.

Two copperplates in quarto folio, drawn by Scarpa and engraved in stipple, the first by Charles Knight of London, and the second by Quirin Mark of Vienna(1753–1811). The plates are the same in both editions and represent the position and distribution of the olfactory nerves. To each plate is added an outline plate with letters.

Anatomicae disquisitones de auditu et olfactu. Ticini, in typographeo Petri Galeatii, 1789, fol., *cum fig.—Editio altera auctior; Mediolani, in typographeo Josephi Galeatii,* 1795, fol., with figures.

Both editions contain the same copperplates, viz., eight finished plates, each with an outline plate with letters. The first five plates deal with zoötomic subjects, the last three with human anatomy. They are all drawn by Scarpa. The first two are engraved by Benedetto Eredi of Florence, the third does not give the name of the engraver, but seems to have been done by Faustino Anderloni, whose name is signed under the last five plates. This work was translated into German:

Anatomische Untersuchungen des Gehörs und Geruchs. Aus dem Lateinischen (übersetzt von Christian Heinr. Theod. Schreger). Nürnberg, in der Raspeschen Buchhandl., 1800. 4°, with copperplates.

The figures of the original plates are complete and have been re-engraved in the same size. They are, however, of inferior workmanship. The outline plates are missing, and the letters are engraved upon the finished figures. There are altogether seven plates, since on the sixth plate two were combined. Neither the artist nor the engraver is mentioned.

Tabulae nevrologicae ad illustrandam Historiam Anatomicam cardiacorum nervorum, noni nervorum cerebri, glossopharyngaei, et pharyngaei ex octavo cerebri, Ticini, apud Balthassarem Comini, 1794, large fol., with figures.

This is Scarpa's anatomic masterpiece. It contains seven finished plates, the last of which is zoötomic (animal hearts). Each plate is accompanied by an outline plate of the same size with explanatory markings. They are all drawn by Scarpa and engraved by Faustino Anderloni. The figures are all life-size representations of the organs.

De penitiori ossium structura commentarius, Lipsiae, sumtibus J. F. Hartknoch, 1799, large 4°, with figures.

This contains three copperplates drawn and engraved by (Faustino) Anderloni, representing the texture of the bones. Partly zoötomic and partly pathologic models of exact representations. Another edition, *Placentiae*, 1800 (1799), 8°, which seems to have preceded this work is mentioned, but that edition appears to have contained no copperplates, or only a few. It was translated into German:

Vom inneren Baue der Knochen. Verdeutscht, mit einer Vorrede und einigen Anmerkungen begleitet von Theod. Georg August Roose, Prof. zu Braunschweig, Leipzig, bei J. F. Hartknoch, 1800, large 4°, with copperplates.

The inserted copperplates are proofs from the original plates. An English translation is: *A treatise on the minute anatomy of the human bones*, London, 1830, 18°, with illustrations. Later Scarpa published an enlarged edition of this work:

De anatome et pathologia ossium commentarii. Cum tabulis aeneis, Ticini, typis Petri Bizzonii, 1827, large 4°, with figures.

This edition contains the complete commentary with the three copperplates. On pages 47 to 136 is given a treatise on callus following fractures, illustrated by two new copperplates drawn by Faustino Anderloni and engraved by L. Miazzi and representing also diseased bones. The entire edition thus contains five copperplates. Compare Vincenzo Malacarne: *Auctarium observationum et iconum ad osteologiam et osteopathologiam Ludwigii et Scarpae, Patav.*, 1801, 8°. The French army surgeon Jean Baptiste François Leveillé, who as such lived a short time in Pavia and was a friend of Scarpa's, edited: *Mémoires de physiologie et de chirurgie pratique*, Paris, 1804, 8°, in which edition the *Comm. de penitiori ossium structura* was also inserted.

Ebert: no. 20471–82.

SAMUEL THOMAS VON SOEMMERRING

Samuel Thomas von Soemmerring was born at Thorn on January 18, 1755, and died at Frankfort on the Main on March 2, 1830. He was the son of Johann Thomas Soemmerring, the city physician of Thorn, and from 1774 he studied at Göttingen, having Wrisberg for his teacher of anatomy. On April 7, 1778, he received his doctor's degree there and in May of the same year he set out on a scientific journey to England, Scotland, and the Netherlands, which led to particularly close friendships between himself and William Hunter and Pieter Camper. In 1779 he became professor of anatomy at the Collegium Carolinum in Cassel, and in 1784 professor of medicine at Mayence. In 1797 he established himself as a physician at Frankfort on the Main. Between 1805 and 1820 he lived at Munich as a member of the Academy of Sciences and became Royal Physician. From 1820 until his death he again lived at Frankfort on the Main, practicing medicine.

As far as pictorial representation is concerned, Soemmerring can be compared to no other anatomist so fittingly as with Albinus, whom he himself esteemed very highly. He aimed, like Albinus, at the discovery of the true and beautiful in the form of every part of the human body and combined a perfect sense for artistic representation with the most exact perception of details. He endeavored, like Albinus, to have every part reproduced just as it existed in the living body, and not as it appeared after death from the treatment of the anatomist. This is one of the reasons that Soemmerring's pictures have, for a long time, maintained such a strong influence both in anatomy and anatomic illustrations. They displaced all the repulsive, unaesthetic, and unnatural features so often prominent in earlier anatomic representations by the substitution of incomparably better ones. To a very large extent this was due to the fact that Soemmerring was himself a good artist and had been endowed with an artistic sense for the beautiful. This made him careful in his choice of artists, as one may conclude from the number of copper engravers who worked for him.

For the drawing of his plates he had himself trained Christian Köck, a stucco-worker, modeler, and draftsman, whom he had found in Mayence and whom he esteemed highly. Köck was indeed especially gifted for that kind of illustration and knew how to use sepia and pigment, but

particularly the pencil, to excellent advantage. He turned out most admirable illustrations, unexcelled in purity, certainty, and truthfulness, a great number of which were found in Soemmerring's posthumous works. (Rudolph Wagner: *Sömmerring's Leben und Verkehr, etc.*, p. 132.) But Köck caused him also a great deal of trouble, especially when he went to Moscow, where he was very unfortunate and could only return to Munich in 1809, after great pecuniary sacrifices on Soemmerring's part. In Frankfort, as in other cities, Köck lived with Soemmerring. Köck died in 1818.

What demands Soemmerring himself made upon anatomic illustration may be best learned from the prefaces accompanying the illustrations of the sense organs. From the preface to the illustrations of the eye:

What is the purpose of such an illustration? Certainly nothing else than a pictorial reproduction of a single surface of a preparation instead of a demonstration in nature, etc. Since, therefore, even the best representation never attains to nature's perfection in respect of minuteness and variation, and since what we show the amateur in place of nature is only a very poor substitute, it seems only fair to demand that every possible effort should be made to approach nature as nearly as possible; or at least to reproduce it just as well as possible. It will still be imperfect enough, etc.

To Plate I pertaining to the eye:

I also think that physiologists who can avail themselves of a sufficiently large number of subjects and of ample opportunities to examine them should always select the most perfect and therefore most beautiful specimen for the model of their descriptions. Since the anatomic description of any particular organ, generally speaking, is just as idealistic as the representation and description of that same organ in a sketchbook, it seems appropriate to follow the same principles in describing it. Just as, on the one hand, we assume that all the works of art representing the human body and claiming ideal beauty for themselves must needs be correct from an anatomic point of view, so, on the other hand, should we as readily expect that everything that the dissector describes anatomically as a normal structure must needs be exceptionally beautiful. Without having found and established such a norm, by means of frequent investigations and abstractions, one is not even able to decide what cases are deviations from the perfect norm, etc. With this in mind, one is all the more bound to recommend the imitation of the masterpieces of the great Albinus, works of Attic perfection. Very few attained to their height, none transcended it, etc.

From the preface to representations of the auditory organ:

We endeavored throughout to be faithful to the principles of the great Albinus, and strove to represent the connections between different parts just as they occur in nature, and not to picture anything in any way distorted, dried, shriveled, torn, or dislocated, and also to select only that which proved to be the most excellent or most perfect specimen among many, in other words, the anatomic norm, etc. It therefore remains the indispensable duty of the physiologist to find the true norm of the organs and when he really knows them to demonstrate them to the draftsman who cannot

know them without him. In short, it is the duty of the physiologist to replace with the aid of his intelligence, what such a preparation must needs lose of its natural form in alcohol, or through mounting in various positions, etc. The person who cannot trust himself to do this should leave such things alone, etc.

From the Preface to representations of the olfactory organ:

I always endeavored to be faithful to the principles laid down by the great Albinus and to follow his unparalleled examples, which teach us that, in making a representation of a norm, we have to let our intelligence detect and remedy such deviations as occur in specimens taken from cadavers, in consequence of death, preparation, or preservation, etc.

From the Preface to the representation of the vocal organ:

In making this plate, I also endeavored to follow the beautiful and unsurpassed examples which Albinus gave us in his representations of the bones, and to reproduce the shapes of these cartilages, etc., architecturally, i.e., viewed from all sides. This puts everybody in a position even to emboss these cartilages without leaving out any of the necessary details and without making any mistake.

If one compares these principles, laid down and maintained by Soemmerring, with all that has been said in the articles on Albinus and Camper, he will at once recognize how Soemmerring trained himself in the sight of these men and under their influence. It becomes also apparent that Soemmerring gave preference to the architectural conception of anatomic subjects over the perspective, picturesque view. Thanks to this conception, it became possible that several of his pictorial representations could be reproduced plastically. The representations of the eye served as models for reproductions of the eye made in various materials by mechanics. The representations of the ear served as models for reproductions in wax and plaster, those of the base of the brain and the embryo for relief reproductions in wax, etc. Not all these reproductions could have been made if his illustrations had not been most conscientious copies of nature and had not complied strictly with the demands which Soemmerring himself made upon them.

Many of these works by Soemmerring contain criticisms of former illustrations of the same subject (for instance the inaugural dissertation on cerebral nerves and the essay on the embryo) and they are, in this respect too, instructive contributions to the history of anatomic illustration. .

This same endeavor to furnish clear and living, true-to-nature representations is also found in all the literary productions from Soemmerring's hand, and to an especially high degree in his principal work: *Vom Bau des menschlichen Körpers*. Indeed they are the real cause of the great and lasting value attached to this work and of its widespread usefulness.

Soemmerring's literary activity was very considerable. Only the following are of importance to us:

De basi encephali et originibus nervorum cranio egredientium libri quinque. Cum IV tabulis aeneis, Goettingae, apud Abr. Vandenhoeck viduam, 1778, 4°; 4 leaves and 184 pp.

This is Soemmerring's inaugural dissertation, written at Wrisberg's instance, and is of lasting anatomic value. The plates in quarto are drawn by Soemmerring and engraved by Carl Christian Glassbach, Jr., of Berlin. The second is an outline plate, all the others are finished. The last plate is a profile cross-section of the brain, the first three plates are representations of the base of the brain and the nerves arising there. Christian Friederich Ludwig: *Scriptores nevrologici minores, Lips.,* 1791–95, 4°, Vol. II, is an enlarged edition of this work revised by the author.

Ueber die Wirkungen der Schnürbrüste; with 1 copperplate, new edition, completely rewritten, Berlin, Voss, 1793, 8°, 84 pp.

This treatise, while pertaining to personal hygiene, contains nevertheless a great deal of anatomic information and is especially important to us on account of its copperplate in oblong folio, drawn by Christian Köck, and engraved by Daniel Berger. This engraving represents with anatomic exactness the outline as far as the knees of the Venus di Medici, copied from Gérard Audran, the skeleton drawn within the frame outline, the body of a girl disfigured by corsets, and finally an illustration of the deformity of the skeleton due to lacing. The first edition appeared in Leipzig, 1788, 8°, and had no illustration. It contained, however, a second treatise on the same subject by an unknown author and a preface by Christian Gotthelf Salzmann. This book concerns itself only with the stiff tapering corsets which were then in use.

Ueber die körperliche Verschiedenheit des Negers vom Europäer, Frankfurt und Mainz, bei Varrentrapp Sohn und Wenner, 1785, 8°, 28 and 81 pp.

The first edition of this important book, published in Mayence, 1784, 8°, contained no illustrations, but this second edition is said to contain pictures on two illuminated copperplates (see Wagner: *Samuel Thomas von Soemmerring's Leben,* p. 12). Yet neither in the title nor in the text is there any mention made of these pictures. Only in the Preface (p. 18) is it said: "and I also add a few drawings which were done rather correctly by Mr. Range of Cassel from negroes who are still living." The three copies, however, of the edition of 1785, which I saw, did not contain any illustrations. A negro colony, founded by the landgrave of Hesse-Cassel in a little village on the Wilhelmshöhe near

Cassel, gave Soemmerring ample opportunity to study and to dissect negroes of both sexes. The results of these studies were published in this book:

Ueber das Organ der Seele; with (3) copperplates, Königsberg, Friedr. Nicolovius, 1796, 4°, 8 and 87 pp.

This book is less valuable for its hypothesis asserting that the moisture of the ventricles of the brain is the organ of the soul, than for its exact investigations of the cerebral origins of the nerves. The plates, one of which is wholly an outline plate, were drawn by Christian Köck and engraved by Ludwig Schmidt. The first two plates represent an excellent, and even today the best view of a profile cross-section of the brain, utterly different from the one presented in the inaugural dissertation. The last plate represents the fourth ventricle of the brain opened from above and from behind.

Tabula sceleti feminini juncta descriptione. Trajecti ad Moenum, apud Varrentrapp et Wenner, 1797, large fol., 1 copperplate and 1 leaf of text.

Since Albinus furnished the most perfect and most faithful representation of a male skeleton and expressed his regret that there was no equal representation of a female skeleton, Soemmerring undertook to make such a representation in the corresponding proportions. He went to work most carefully in preparing for this task. Not satisfied with the female skeletons in his own collection, he selected the skeleton of a well-built girl of twenty years, a native of Mayence, who had once borne a child and whose skeleton had been given over for purposes of anatomy. He also procured from Blumenbach's collection the famous skull of the Georgian woman, which he used for the drawing, by way of comparison with the skull of the above-mentioned girl. No less care was taken in selecting, with the assistance of artists and connoisseurs, the most appropriate posture and the contour of an ideally perfect female body in which the skeleton might be drawn to observe its proportions. Several living bodies were on this occasion compared for the purpose, and Soemmerring did justice particularly to the Mayence beauties. But the Venus di Medici and the smaller Venus of Dresden, still more delicate in its proportions, although unfortunately greatly restored, were also used for comparisons. In this way a beautiful representation of a skeleton was produced as one must conceive of it in the living body. Christian Köck's drawing of it was necessarily a somewhat idealized one, since it had to represent not an individual form but the most beautiful norm as it was imagined to exist in life, with all the carefully observed minutiae of the differential sexual characters of the entire bony

structure of woman. The engraving was done in Stuttgart by Baehrenstecher under the direction of Johann Gotthard von Müller. Later, Kilian had the skeleton of the Mayence woman used by Soemmerring drawn in a life-size and individually faithful illustration for his obstetric atlas.

[A criticism of Soemmerring's illustrations of the female skeleton is contained in the *Journal der Erfindungen, Theorieen und Widersprüche in Natur- und Arzneiwissenschaft, 1797, no. 24;* an answer appeared in 1798, no. 28. A side and a front view of the skeleton of the Mayence girl used by Soemmerring is reproduced in life-size in Hermann Friedrich Kilian: *Geburtshülflicher Atlas, Düsseldorf, bei Arnz* (1835), large folio, in forty-eight lithographic plates. Each trio of the Plates I–VI, pertaining to this skeleton, can be put together to form a whole plate.]

Icones embryonum humanorum, Francof. ad. Moenum, ap. Varrentrapp et Wenner, 1799, large fol., 10 pp.; 2 large copperplates and 2 vignettes.

This work had been planned as an appendix to William Hunter's *Anatomia uteri humani gravidi* (see p. 296) and therefore presents the illustration, there missing, of a succession of the embryos in the earlier period of pregnancy and the embryo with its coverings in the later period. No anatomy is given, only the external forms. The artist of these plates likewise was Christian Köck, the engravers were F. L. Neubauer, Hüllmann, and the Klauber brothers. The two vignettes occur on the title and on page ten. This ranks among the most valuable works of Soemmerring and is even today useful and highly appreciated. Both the drawing and the engraving show admirable execution.

Tabula baseos encephali, Francof. ad. Moenum, sumtibus auctoris, 1799, fol., 16 pp. and 2 copperplates.

This contains an aquatint representing the brain of a three-year-old boy drawn by Christian Köck and engraved by Pierre Michel Alix of Paris (b. Honfleurs 1752). The prints were made in Paris under the personal supervision of the engraver and of the physician Johann Gottfried Ebel. Copies of the book were provided with the first three hundred impressions of the plates, bare and unlettered. Of the later inferior prints one impression with printed letters was added to each copy, so that the entire edition consists of only three hundred copies, each of which must have one well-imprinted plate, unlettered, and one poorer print with letters. The brain is represented with an unexampled fidelity. The nerves of the spinal cord are less carefully treated than in the author's inaugural dissertation.

Abbildungen des menschlichen Auges, Frankfurt am Main, Varrentrapp und Wenner, 1801, fol. (Latin by Bernhard Nathanael Gottlob Schreger: *Icones oculi humani, Francof.*, 1804, fol.); 10 and 110 pp. with 16 copperplates, of which 8 are finished, 7 in outline and one is an illuminated reproduction of Plate V.

This is Soemmerring's most perfect work and has, after Zinn's monograph (Göttingen 1780, 4°), become the foundation for all modern researches on the structure of this organ. The first plate contains representations of the living eye in its perfect form, reproduced from living models, such as the eye of a male, that of a female, that of a negro, that of an Albino, that of a person sleeping (Soemmerring's wife), all seen directly from the front and in profile. The other plates are anatomic and partly microscopic. Two of them were colored, viz., the fifth, which occurs three times as an outline plate, as a finished plate, and a colored one, and the last, or eighth, finished plate which is also partially colored. The artist was Christian Köck, the engravers were Vincenzo Scarpati of Naples (who engraved only the first and the fifth finished plates and nothing else), the brothers Klauber, Clemens Koll of Vienna (b. Prague 1754, d. Vienna 1807), Johann Christoph Bock (b. Nuremberg 1752), Johann Conrad Felsing of Darmstadt (b. Giessen 1766, d. Darmstadt 1819). The plates in the Latin edition are the same.

Abbildungen des menschlichen Hörorganes, Frankfurt a. M., Varrentrapp und Wenner, 1806, fol. (Latin by Christian Heinrich Theodor Schreger: *Icones organi auditus humani, Francof.*, 1806, fol.); 10 and 36 pp., 9 copperplates, of which 4 are in outline.

This work was produced at the request of Professor Lichtenberg, of Göttingen, to furnish him greatly enlarged reproductions of the human ear for his lectures on physics. Soemmerring, with the aid of Köck, at once undertook the task. Specimens of such enlargements were cast for Göttingen, Bamberg, and Utrecht, but before Soemmerring had had a chance to make a cast for himself, the forms, through some accident, were spoiled. After that Soemmerring and Köck, now perfectly familiar with the subject, worked out pictorial representations instead of plastic models. A selection of these illustrations is contained in the above work. They represent the parts in natural size, some very much enlarged, and rank among the most excellent works that have been produced dealing with the entire human ear. Here, too, the first plate gives the shape of the external ear. The artist is Christian Köck, the engravers are G. Rücker and Johann Christoph Eckardt (the latter engraved only one plate).

Abbildungen der menschlichen Organe des Geschmackes und der Stimme, Frankfurt a. M., Varrentrapp und Wenner, 1806, fol. (Latin: *Icones organorum humanorum gustus et vocis, Francof.,* 1808, fol.); 12 leaves and 4 copperplates, 2 in outline.

The plates are drawn by Christian Köck, engraved by Johann Blaschke, of Vienna, and G. Rücker. The book, by the way, contains only representations of the tongue and the male larynx. The representations of the tongue are of especially great value.

Abbildungen der menschlichen Organe des Geruches, Frankfurt a. M., Varrentrapp und Wenner, 1809, fol. (*Icones organorum humanorum olfactus, Francof.* 1810, fol.); 9 and 24 pp. and 9 copperplates, of which 4 are entirely in outline.

This book again gives very complete illustrations. The first plate, representing a cross-section of the skull and the throat extending below the larynx, with indications of the locations of all the soft parts, is an especially instructive fundamental picture, not only of the olfactory organ, but also of all the other sense organs. The other plates pertain only to the olfactory organ. The drawings are by Christian Köck, the engravings by Carl Schleich and Paul Jacob Laminit (b. Augsburg 1773).

Several of these works on the sense organs were translated into French, Italian, and perhaps other foreign languages. We do not mention translations here, because they do not contain any original plates.

Besides these principal works, we must also mention a few essays by Soemmerring which were provided with illustrations and were published separately. They are also contained in the *Denkschriften der Akademie zu München, physikalisch-mathematische Classe.*

Ueber das feinste Gefässnetz der Aderhaut im Augapfel (*Denkschriften,* Vol. VII, p. 4). Munich, Franz, 1821, 4°, with copperplates.

Bemerkungen über den Magen des Menschen (*Denkschriften,* Vol. VIII, p. 77). Munich, Franz, 1821, 4°, with 1 copperplate.

In 1804 the Academy of Sciences in Berlin offered a prize for the best essay on the structure and the function of the lungs. The Strasburg physician, Franz Daniel Reisseisen, obtained the prize; Soemmerring received honorable mention. The former inserted a number of fine sketches in his essay, the latter several preparations. The texts of both prize essays were jointly published at Berlin, 1808, 8°. The engravings belonging to Reisseisen's essay were published in 1822 at Berlin by Rücker, in imperial folio, with the German text and the Latin translation by Justus Friedrich Karl Hecker, and included six colored copper engravings. The publication of illustrations made after Soemmerring's

preparations had also been promised, but was never realized, as must be mentioned here for correction of erroneous statements. When Soemmerring, on April 7, 1828, celebrated the jubilee of his promotion to the doctor's degree, a great many congratulatory essays with scientific contents, some of them with beautiful illustrations, were published in accordance with a laudable tradition prevalent among German scholars. The following may here be mentioned:

Samueli Thomae Soemmerringio—die VII. Aprilis decem lustra post gradum Doctoris medicinae et chirurgiae rite captum felicissime et in summum scientiae emolumentum peracta celebranti pia mente gratulatur Jo. Frid. Meckelius. Accedunt tabulae aeneae sex. Halae 1828, Lipsiae, prostat apud Leop. Voss, ex officina Hirschfeldii, large fol., 4 and 16 pp. and 6 copperplates.

This work, in the largest "Colombiaformat," necessary through the size of some of the engravings, is typographically elegant, and is especially remarkable on account of its illustrations. Johann Friederich Meckel, Jr., an anatomist of Halle (1781–1833), was still in possession of six copperplates which had been engraved for his grandfather, Johann Friederich Meckel, Sr. (1713–74), an anatomist of Berlin, who had been unable to publish them. The engravings in the above-mentioned essay are these same six copperplates. They are representations of the lymphatic system drawn by Johann Bernhard Gottfried Hopfer (b. Redelsee in Wanconia 1716, d. Berlin 1789), and were engraved by Christoph Benjamin Glassbach, Sr. (b. Magdeburg 1724, d. 1779). The text contains only the explanations.

Zu Samuel Thomas von Sömmerring's Jubelfeier von Friedrich Tiedemann. Heidelberg and Leipsig, Gross, 1828, 4°, 32 pp., a portrait of Soemmerring, and 1 copperplate.

Here Soemmerring's pupil and friend of many years presents investigations of the ova and of the history of the development of the tortoise which he had been carrying on with the aid of tortoise eggs, partly with fetus, received from Brazil.

Untersuchungen über die Gefässverbindung zwischen Mutter und Frucht in den Säugethieren. Ein Glückwunsch zur Jubelfeier Samuel Thomas von Sömmerring's von Karl Ernst von Baer, with 1 copperplate; Leipzig, Leop. Voss, 1828, fol., 8 and 30 pp.

The plate drawn by the author and engraved by G. Loreck is an illuminated colored print.

De foetu humano adnotationes anatomicae, quibus praemissis—Samueli Thomae de Soemmerring doctoratus in medicina impetrati semisaecularia

gratulatur Universitas literarum Regiomontana interprete Carolo Friderico Burdach, P. P. O. Accedit tabula aenea. Lipsiae, apud Leop. Voss, 1828, fol., 4 and 8 pp.

The plate was drawn by Knorre and Rundt and was engraved in stipple by F. W. Linger, Jr., of Berlin. The text contains remarks on the anatomy of the human fetus in its earliest stage.

Samueli Thomae equiti a Soemmerring—de quinquaginta annis post summos in medicina honores rite captos—exactis gratulantur Regiae Academiae scientiarum Monacensis classis physico-mathematicae sodales, etc. (*Ignat. Doellinger de vasis sanguiferis, quae villis intestinorum tenuium hominis brutorumque insunt dissertatio, C. F. P. de Martius Soemmerringia, novum plantarum genus*). *Monachii, apud Lindauer,* 1828, 4°; with 2 lithographic plates.

We are here concerned with Döllinger's work on the bloodvessels of the villi of the small intestines, with an anatomic illustration. The botanic plate represents a leguminous plant of the genus *Soemmerring*, which Martius named after Soemmerring.

Besides several portraits of Soemmerring, scattered in writings and portrait collections, particular mention should be made of the following:

A lithographed print in imperial folio by C. Thelott and C. F. Vogel, Frankfurt, 1828.

A copper engraving in medallion shape, after an oil portrait of Soemmerring painted during his last years, drawn by Bagge after Thelott, engraved by Carl Barth in Hildburghausen, before Wagner's publication of a biography of Soemmerring.

A medallion, done at Berlin by Loos, for the jubilee celebration in 1828.

For an appreciation of Soemmerring's life and scientific accomplishments, the following writings are also important:

Ignaz Döllinger: Gedächtnissrede auf Samuel Thomas von Sömmerring. Gehalten in der K. Academie der Wissenschaften zu München, Munich, 1830, 4°.

Rudolph Wagner: Samuel Thomas von Sömmerring's Leben und Verkehr mit seinen Zeitgenossen. Erste Abtheilung: Briefe berühmter Zeitgenossen an Sömmerring. Zweite Abtheilung: Leben Soemmerring's nebst einem Anhang von Briefen und Aufsätzen, so wie einem Porträt Soemmerring's. Leipzig, 1844, 8°. (Also forms Vol. I of the new original edition of Soemmerring's *Vom Baue des menschlichen Körpers.*)

Detmar Wilhelm Sömmerring (*fil.*): *Catalogus musei anatomici, quod collegit S. Th. de S. Francof. a. M.,* 1830, 8°.

EDUARD SANDIFORT

Eduard Sandifort, at one time physician at The Hague, was afterward successor to Albinus in the chair of anatomy and surgery at Leyden, where he had received the doctor's degree in 1763, and where he died in 1819 at an advanced age. Like Albinus he directed his efforts to the development and perfection of anatomic drawing, and is therefore mentioned here, although most of his works pertain to pathologic anatomy. In addition to the one work referred to in the article on Vesalius (p. 197), the following deserve mention:

Tabulae intestini duodeni, Lugd. Batav., apud P. v. d. Eyk et D. Vygh, 1780, 4°, 50 pp. and 5 copperplates in oblong folio.

This is the most valuable monograph on the duodenum, as far as its shape and its position are concerned. The textural qualities are not touched upon. Sketches were made from more than fifty cadavers of different ages, from which sketches those given in this work were selected as an accurate illustration of the anatomic norm. The plates contain both finished and outline figures and are most appropriately and clearly engraved by Robert Muys (b. Rotterdam 1742). The drawings were made by Abraham Delfos (b. Leyden 1731).

Museum anatomicum academiae Lugduno-Batavae descriptum, etc. *Lugd. Batav., apud S. et J. Luchtmans, academiae typographos,* 1793, large fol., Vol. I, 26 leaves, 335 pp., and 9 copperplates; Vol. II, 2 leaves, 122 pp., and 127 copperplates.

The first part of this important work, which was published by request of the curators of the University and the council of the city of Leyden, contains a history of the anatomists of the University of Leyden beginning with Gerard Bontius (b. Ryswik 1538, d. Leyden September 15, 1599). Appended to the first volume are nine finished copperplates, each representing in natural size the profile and the front view of a skull. The skulls represented are those of a Calmuck, a Tartar from Kazan, a negro, a Russian, a Swede, an Englishman, a Frenchman, an Italian, and a woman from Hanover. In the second volume are one hundred and twenty-seven inclosed copperplates on pathologic-anatomic subjects, one hundred and three of which pertain to osteology, ten to the anatomy of the soft parts, two to the study of concrements, while the last twelve represent monsters. Abraham Delfos, again, made

the drawings; the above-mentioned Robert Muys and Pieter de Mare (b. Leyden 1757, d. there 1796) engraved them. The main titles of both volumes are copper engravings. The third volume of the Museum was edited by the author's son, Gerard Sandifort, *Lugd. Bat.* 1827, large fol., and contained the additions from the collections of Brugmans, professor of natural sciences in Leyden. The third volume is without illustrations. All three volumes are printed on writing paper. A fourth volume was published *Lugd. Bat.*, 1835, large fol., with seventy copperplates.

The *Descriptio musculorum hominis, Lugd. Bat.* 1781, 4°, and *Descriptio ossium hominis, Lugd. Bat.* 1785, 4°, both edited by Eduard Sandifort, do not contain any illustrations. Illustrations, although mostly of pathological anatomy, may, however, be found in the following works:

Observationes anatomico-pathologicae, Lugd. Bat., apud P. v. d. Eyk et D. Vygh, 1777–81, 4°, 4 volumes with 36 copperplates in oblong folio.

Exercitationes academicae. Lugd. Bat., apud. S. et J. Luchtmans, P. v. d. Eyk et D. Vygh, 1783–85, 4°, 2 volumes with 15 copperplates in oblong folio.

Anatome infantis cerebro destituti, Lugd. Bat., apud eosdem, 1784, 4°, with 6 copperplates in oblong folio.

The following works were written by his son, Gerard Sandifort:

Tabulae anatomicae, situm viscerum thoracicorum et abdominalium ab utroque latere, ut et a posteriore parte depingentes. Praecedit observatio de anevrysmate arteriae iliacae internae, rariore ischiadis nervosae causa, Lugd. Bat., apud S. et J. Luchtmans, 1801–4, large fol., 4 parts with 9 copperplates.

This, in four volumes, contains nine copperprints, engraved by Robert Muys and drawn by the author, with the text accompanying the plates.

Tabulae craniorum diversarum nationum. Delineavit et descripsit G. S. Lugd. Bat., apud. S. et J. Luchtmans, 1838–43, large fol., 3 parts with 18 copperplates.

In these three volumes, the eighteen copperplates were drawn by the author and engraved by Daniel Veelward. Each print represents in life-size a left profile and a front view of a skull. Each engraving is supplemented by a printed page of text. The skulls shown are those of a Greenland woman, a Roman soldier of Pompeii, an Amboina Islander, a Kaffir, a Hottentot, a Bushman, a North American, a Ceylonese, a Chinese, a Japanese, a Papuan of New Guinea, a New Hollander of New South Wales, an aboriginal Alaskan Indian (*Schitgagan*) of New Norfolk, a Guanche of Teneriffa, a Turk, a Negro of Darfoot, a Japanese, a Jew. The measurements and proportions are given for each skull.

CORNELIS PLOOS VAN AMSTEL

Cornelis Ploos van Amstel, an artist and copper engraver, who was also well known as an art collector and as a maker of colored copperprints, was born at Amsterdam in 1726 and died there in 1798. He was the author of an exhaustive and useful textbook:

Aanleiding tot te kennis der anatomie, in de tekenkunst, betreklyk tot het menschbeeld. Met eenige plaaten, en daar bygevoegde verklaaringen, opgehelderd, Amsterdam, by J. Yntema, 1783, 8°, 14 and 114 pp., 27 copperplates in 8°, of which 9 are printed in red.

The plates are from line drawings, very cleanly engraved faithful sketches from nature. They represent bones, ligaments, and muscles of the trunk and of the extremities, mostly in the style of Albinus.

The same illustrations, re-engraved by L. Halder, recur in

Johann Heinrich Lavater: Anleitung zur Anatomischen Kenntniss des menschlichen Körpers für Zeichner und Bildhauer. Mit vielen Kupfertafeln, grösstentheils nach den Albinschen des Herrn Ploos von Amstel, Zürich, Ziegler, 1790, 8°, 16 and 179 pp. and 27 copperplates in 8°.

Many of the prints in this edition were made by means of two plates in such wise that the bones appear black and the muscles and ligaments red. The text of the book is new. This work by Lavater was translated into French by Gauthier de la Peyronie and published with annotations under the title:

Elémens anatomiques d'ostéologie et de myologie à l'usage des peintres et sculpteurs par J. H. L. Paris, chez la veuve Tilliard et fils, Zürich chez Ziegler et fils, Basle, chez Thourneisen, 1797, 8°, 8 and 157 pp. and 27 copperplates.

This contains throughout the same illustrations as in the German edition, some of them also printed in black and red. Johann Martin Fischer of Vienna, by the way, accused Lavater of having copied word for word the first edition of Fischer's own commentary to his anatomic statue.

Weigel: no. 10977, 6876, 6877.

PAOLO MASCAGNI

Paolo Mascagni, anatomist, was born at Castelletto (in Siena), in 1752, and died at Florence, October 19, 1815. In 1774, he succeeded his teacher Tabarani in the chair of anatomy at Siena, accepted the professorship at Pisa in 1800, and was, a year later, appointed instructor in anatomy and physiology in the hospital of Santa Maria Nuova at Florence.

In response to a prize question on the lymphatics, repeatedly announced by the Academy of Sciences of Paris, Mascagni sent two memoirs with illustrations. He did not receive the prize. The Academy, however, announced a new competition for 1789. Chiefly to insure the priority of his discoveries (his work with the lymphatics dated back as far as 1777) Mascagni published in French:

Prodrome d'un ouvrage sur le système des vaisseaux lymphatiques, contenant 24 planches in folio, Sienne, 1784, 4°.

This contained, however, only four folio plates of the twenty-four promised for the work as planned. The language of the book was severely criticized, and in reply to a sharp criticism in a Venetian periodical, Mascagni wrote a passionate rejoinder, entitled: *Lettera di Aletofilo al Giomalista, medico di Venezia, Misopoli* (Siena), 1785, 12°. Continued studies, however, soon enabled him to publish a more extensive work on the lymphatics, which made him lastingly famous.

Vasorum lymphaticorum corporis humani historia et ichnographia. Senis, ex typographia Pazzini Carli, 1787, large fol., 138 pp. text.

This contained forty-one copper engravings in folio, fourteen of which were linear copies of as many finished prints. Mascagni had been able to induce his artist and engraver, Ciro Santi (Cyrus Sanctius) of Bologna, to move to Siena to do work for him there. The plates show a fine and careful workmanship and a faithful and truly masterful representation of the lymphatics. Plates I, IV, VIII, XXII, had been published before, in the *Prodrome*. Most of the plates are signed *Cyrus Sanctius A. C. ad ipsa corpora delin. et inc.* or bear a somewhat briefer signature, while some of them are without any signature. The title had engraved on it a vignette by the same artist, and after it there follows the dedication. The Latin text was published separately: Siena, 1795, 8°, and an Italian translation: Colle, 1816, 8°. A German translation by Christoph

Friederich Ludwig was published in Leipzig, 1789, 4°, with some of the illustrations re-engraved by Johann Stephen Capieux of Leipzig, and was the first one of three volumes on lymphatics, the two other volumes containing works by Cruikshank and others. Leipzig, 1789 and 1794, 4°.

At Mascagni's death, manuscripts and sketches for three other works were found, namely: (1) for an anatomy for artists; (2) for a compilation of the minute, histologic investigations on the anatomy of the human body, animals, and plants, most of them microscopic investigations, accompanied by twenty plates; (3) for a large complete anatomy of man in life-sized illustrations. The publication of these three works was at once undertaken, chiefly on account of the surviving family, as Mascagni had died without means. The anatomy for artists was edited by the brother and the grandchild of the deceased anatomist, Bernardo and Aurelio Mascagni, under the title:

Anatomia per uso degli studiosi di scultura e pittura, opera postuma di Paolo Mascagni. Firenze, dalla tipografia di Giovanni Marenigh, a spese degli eredi, 1816, large fol., 6 and 35 pages of preface and introduction, and fifteen large copperplates, ten of which are each accompanied by a separate page of printed explanation. The book is concluded by a page of *Indice delle materie.*

The first two plates represent front and back views of the skeleton with the ligaments. The names of the bones are engraved directly on the plate. At the bottom is engraved *Antonio Serantoni del., Carlo Lasinio diresse, Agostino Costa scu.* The remaining thirteen plates contain no words directly on the plate, except the signature of *Antonio Serantoni del. e scolpi* (who had for fourteen years been Mascagni's anatomic artist). Plates III–V represent front, back, and side views of a muscle-man. Plates VI–XV represent separate parts of the body, such as life-size muscles, bones, and ligaments. The muscles are all engraved in red chalk manner, the rest is colored with the brush. The publication was prepared by Mascagni's prosector, the physician Francesco Antommarchi.

The two Mascagnis, who had taken charge of this matter, died soon after its completion, and a group of unnamed persons undertook to publish also the two other posthumous works for the benefit of Mascagni's family. They placed the preparation of the edition in charge of Francesco Antommarchi, the same who had edited the previous work. At first the collection of histologic investigations was prepared for publication. It appeared under the title:

Prodromo della grande anatomia; seconda opera postuma di P. Mascagni, posta in ordine e pubblicata a spese di una società innominata da Francesco Antommarchi, dissettore anatomico nell' arcispedale di S. M. N. (Santa Maria Nuova in Firenze), Firenze, dalla tipogr. di Giov. Marenigh, 1819, fol. (Text: 14 and 195 pp.)

[The *Prodromo* has a blank page before the title, making a total of fifteen pages of preface.]

Tavole figurate di alcune parti organiche del corpo umano, degli animali e dei vegetabili, esposte nel prodromo della grande anatomia di P. M. Firenze, 1819, fol. (Exposition of plates, 103 pp.)

This edition contains twenty copperplates, drawn and engraved by Antonio Serantoni and representing histologically the most heterogeneous subjects. The title *Prodromo,* as one sees, was ill chosen, although it possibly originated with Mascagni himself. The book is rather an absolutely independent work, quite different from and unrelated to the author's large anatomy. Its subject is the textures of the different parts of the human body as compared with the texture of the organs of animals and plants. It contains a great number of different figures, most of which were intended to illustrate Mascagni's view as to the vascular nature of the texture of the organs. The work is beautifully printed, the very fine title-vignette shows a profile portrait of Mascagni, and is signed: *Stefano Ricci sclpi V. Gozzini dis. Antonio Verico inc.* The arrangement of the text and of the representations did not seem satisfactory to contemporaneous critics, and the Milanese physician, Tommaso Farnese, therefore, prepared and published a second edition under the title:

Prodromo della grande anatomia, opera postuma del celebre P. Mascagni. Seconda edizione riveduta ed illustrata da Tommaso Farnese. Vol. I, II, Milano, pr. Batelli e Fanfani, 1821, 8°.

Descrizione delle tavole citate nel prodromo, della grande anatomia, etc. *Vol. I, II, Milano, pr. gli medesimi,* 1821, 8°, 48 copperplates in 4°.

In this second edition of the *Prodromo,* the arrangement of the text and the illustrations are more instructive and more appropriate. The representations are in quarto and are very accurately copied from the original plates, but they are, on the whole, less beautiful. Five of them were engraved by Antonio Rivelanti, thirty-four by Antonio Bernieri, one by Frei, while eight are without signature. The figures on the plates are arranged according to the anatomic subjects they represent. The first thirty-six plates pertain to the anatomy of the human body, the following nine to that of animals, and the last three to the anatomy of

plants. For practical purposes, this edition is to be preferred to that prepared by Antommarchi, on account of the better arrangement and the more convenient size. The make-up of the book, on the other hand, is inferior. The vignette on the title-page of the first volume bears the same signature as the one in Antommarchi's edition, but is evidently copied and is certainly less beautiful.

Before Antommarchi sent the *Prodromo* he had edited to the publishers, he departed for St. Helena to look after Napoleon. He remained at the same time in charge of the publication of the large anatomy and, for this purpose, had taken with him three copies of each one of Mascagni's posthumous plates. But toward the end of 1819, during his stay at St. Helena, differences arose between Antommarchi and the society formed on behalf of Mascagni's heirs, probably because the editions of the *Anatomy for Artists*, and the *Prodromo*, and their sale had proved unsatisfactory. The society dissolved and the contract with Antommarchi was annulled by court decision. In April, 1822, the heirs sold the copperplates of the large anatomy to the Pisa professors Vacca-Berlinghieri, Barzellotti, and Rosini, and these men prepared an edition of this work under the following title:

Anatomia universa XLIV. tabulis aeneis juxta archetypum hominis adulti, accuratissime repraesentati dehinc ab excessu auctoris cura et studio Andreae Vaccà-Berlinghieri, Jacobi Barzellotti et Joannis Rosini, in Pisana universitate professorum, absoluta atque edita. Pisis, apud Nicol. Capurro, typis Firmini Didot, 1823–32, fol. A stout volume in 2 parts without new title.

Anatomiae universae P. Mascagni icones. Pisis, apud Nicol. Capurro, 1823–32, large fol., 90 leaves, title, dedication and 88 plates.

Forty-four of the plates are in color, elaborated by subsequent illuminations. They are accompanied by forty-four superposed outline-plates (*Contratavole*), marked with letters. The size of the bodies is assumed to be three Tuscan *braccie*, equal to five feet, five inches, Parisian measurement, but such parts as are represented separately are sometimes drawn on a still larger scale. The sheets are so large that an entire body can be composed out of three of them when they are joined together. The muscles are drawn on a flesh-colored background produced with the crayon (by means of the roulette) and are further illuminated by means of the brush. The viscera are very faithfully represented; vessels and nerves are shown in red, blue, and white, the colors commonly used to represent anatomic subjects. Copies in black may also be had. Several of the plates are signed *Ant. Serantonj delineavit, sculpsit et coloribus*

expressit; many have no signature at all, while on one of them the engraver, Joseph Canacci, is named besides the artist, Serantoni. This large anatomic work is unique even today, but it is certainly expensive and inconvenient for practical uses. It is, however, useful to the experienced connoisseur, although less so to the beginner, for whom it is not intended. As the editors assure the reader, it is chiefly recommended to the practicing physician and the surgeon. It may be called complete since nothing, except microscopic anatomy, histology, and the lymphatics of the skin have been omitted. Even the pregnant uterus, the placenta, and the fetus are represented in several illustrations. According to the editors' preface, Mascagni was believed to have delayed the publication of the work because he was always hoping to make his plates without the use of the brush, by means of the color print alone.

After the annulment of his contract with Mascagni's heirs, Antommarchi held himself free from any obligations to them and thought he was entitled to have such copperplates of Mascagni's as he possessed lithographed with his own adaptations, and to publish them under his name without exactly denying their origin. In this way the following work came about:

Planches anatomiques du corps humain exécutées d'après les dimensions naturelles, accompagnées d'un texte explicatif par F. Antommarchi, publiées par le Comte de Lasteyrie, editeur, Paris, 1823–26, large fol., title, and 90 lithographic plates.

Explication des planches anatomiques du corps humain, exécutées d'après les dimensions naturelles; par le Doct. F. Antommarchi, publiées par le C. de Lasteyrie, editeur. Paris, chez R. Brégeaut, lithographe breveté, successeur du Comte de Lasteyrie, de l'imprimerie de Dondey-Dupré, 1826, fol., 16 and 228 pp.

Forty-five of the plates are finished, while the other forty-five are in outline and marked. The former can be had illuminated, raising the price of the edition to 1,050 francs; with the plates in black it costs only 375 francs, which proves it to be by far less expensive than Mascagni's work. The illustrations are obviously imitations of those in the latter work. The size and arrangement of the bodies are the same, although here and there details may differ. If one thinks of the *Anatomia universa,* edited by the three Pisa professors, as an adaptation of Mascagni's plates according to the ideas of the three editors, he may, on the other hand, look upon Lasteyrie's lithographed edition as Antommarchi's adaptation, evidently prepared by him at St. Helena for his edition of Mascagni's plates. And it appears that the dishonesty Antommarchi

committed in publishing this (Lasteyrie's) work consisted in his omitting Mascagni's name on the title and in his editing a work undertaken for the benefit of Mascagni's heirs, to their loss. The lithographic plates, by the way, fall short of the copper engravings, particularly in so far as lithography did not succeed in reproducing faithfully the various tissues and in artistically setting them off from one another. Furthermore, twenty-four figures to be found in Mascagni's anatomy are entirely omitted in the lithographed edition. The editors count them in their preface to the second part of their edition, but Antommarchi substituted a few of his own figures.

Mascagni furnished the grand-ducal collection at Florence with a great number of anatomic preparations, and Felix Fontana (d. 1805), with whom he was closely associated while in Florence, made reproductions in wax, after several of Mascagni's preparations, for the wax collection at the Specola in Florence.

For the biography of Mascagni and the history of his posthumous works the following publications are important:

Lettres des heritiers de feu Paul Mascagni à M. le Comte de Lasteyrie à Paris, Pisa, 1823. Complaints about Antommarchi with documents.

Tommaso Farnese: Elogio di P. Mascagni. Milano, 1816, 8°.— *Note addizionali* were later given by the author as a reply.

Francesco Antommarchi: Osservazioni intorno al elogio di P. Mascagni, Firenze, 1817.

JOHANN MARTIN FISCHER

Johann Martin Fischer, a sculptor, was born at Hopfen, Swabia, in 1740 and died at Vienna in 1820. He was a pupil of Schletterer and, from 1785, was professor of anatomy at the Academy of Graphic and Plastic Arts of Vienna.

Aided and instructed by Joseph Barth, professor of anatomy and ophthalmologist at Vienna (b. Malta 1745, d. Vienna 1818), he decided to make an anatomic-myologic statue for the use of graphic or plastic artists. This statue was completed on a reduced scale in the eighties of the eighteenth century, together with a reproduction on a reduced scale of the skeleton which had been used in the making of the statue. After he had become professor, Fischer completed a myologic statue in life-size which was placed in the Academy of Graphic and Plastic Arts of Vienna. In 1803, this statue was cast in soft metal, and the smaller statuette, too, was finished in a more perfect form and rendered salable.

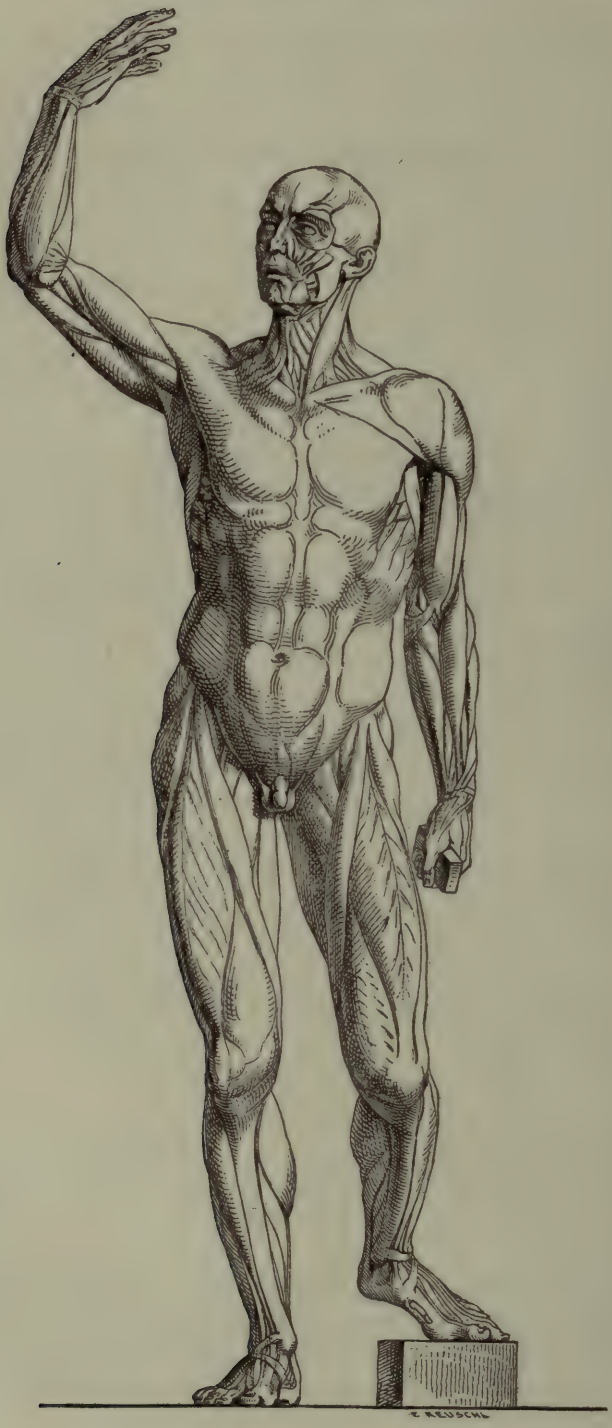
Against Fischer's wishes the president of the academy, Baron von Sperges, had a description of the statue printed. But when, as Fischer asserts, Johann Heinrich Lavater, in 1790, reprinted this description word for word and published the reprint, with engravings by Ploos van Amstel, over his own name as author, Fischer arranged a completely revised second edition of his explanations, which seems to have been published soon after 1790, and finally a third revision, which was probably published about 1806. It seems that this last edition was republished without any changes after Fischer's death under the title:

Erklärung der anatomischen Statue für Künstler. Von J. M. Fischer. Dritte durchaus verbesserte und vermehrte Auflage. Vienna: Carl Gerold, 1838, 20 and 108 pp. without illustrations.

At the same time the following work appeared:

Darstellung des Knochenbaues und der Muskeln des menschlichen Körpers, mit Angabe der Verhältnisse desselben, auf zehn Kupfertafeln. Von J. M. Fischer. Vienna: Carl Gerold, 1838, fol., 12 pp. and 10 copperplates in fol.

The first two plates, marked A and B, are probably new and contain outline representations of the skeleton and its proportions; the four following plates, marked I–IV, are finished figures of the skeleton, with the spear in its left hand; the last four plates, marked V–VIII, are linear



representations of four different views of Fischer's statuette. The text furnishes only an introduction and explanations. The representations of the skeletons are all drawn and engraved by Jacob Merz (b. Buch on the Irchel in the canton of Zürich 1783, d. in Switzerland 1807). The representations of the myologic statuette were made by Fischer himself.

Weigel: Nos. 2076, 7859, 5776[b].

JEAN JOSEPH SUE

Jean Joseph Sue, the younger, a son of the anatomist of the same name and Christian name, and father of the novelist, Eugène Sue, was himself an anatomist and a surgeon. As such he held the position of surgeon at the *Hôpital de la Charité* and was at the same time professor of anatomy and surgery at the medical school and instructor in anatomy for the artists at the Academy of Painting in Paris. It is believed that he died in 1831. He was the author of:

Elémens d'anatomie à l'usage des peintres, des sculpteurs et des amateurs, Paris, 1788, large 4°; with 14 copperplates by Aubert after drawings by Tharsis.

In a manner his more general work also belongs here:

Essai sur la physiognomie des corps vivants, considerée depuis l'homme jusqu'à la plante; ouvrage où l'on traite principalement de la necessité de cette étude dans les arts d'imitation, des veritables regles de la beauté et des graces, des proportions du corps humain, de l'expression des passions, etc. *Paris, chez l'auteur*, 1797, 8°.

[Sue translated into French the *Anatomy of the bones* by the Scotch anatomist, Alexander Monro (1697–1767), and published it under the title: *Traité d'osteologie*, Paris, 1759, large fol., in two volumes, of which the first contains the French text, the second and thinner volume the copperplates. These plates represent whole skeletons, or single bones, the latter either in natural size or in sizes very near the natural. They also represent the skeleton and single bones of the fetus. The workmanship is very fine, especially as regards the single bones. The thirty-one finished plates are without any marking, each one being supplemented by an outline plate, with the necessary notations, thus making a total of sixty-two anatomic plates. The plates are preceded by a large allegoric copper-title of splendid workmanship which, on earlier impressions, bears no indication of the artist or engraver, while later impressions have engraved on the left, below the margin: *J. B. Pierre del.*, and pasted on at the right: *N. Dupuis Sculp.* Of the other plates only II, III, IV, XI, XXVII, XXX, XXXI have the names of the artists; the artist's name is given as *J. Tharsis* (on Plates IV, XXIX), as *Tharsis* (on Plates III, XI, XXX) or *Tarsis* (on Plates II, XXVII, XXX). As engravers are named *Jardinier* (Plates II, III, XI, XXX, XXXI), *M. Aubert* (Plate IV), *Gobin* (Plates XXVII, XXIX). Cf. Haller: *Bibl. anat.*, II, 176, 395.]

See also the section: "Anatomic Color Prints," p. 264.

JUSTUS CHRISTIAN VON LODER

Justus Christian von Loder, physician and anatomist, was born at Riga on February 28, 1753. From 1773 he studied at Göttingen, and in September, 1777, he received his doctor's degree in medicine. In 1778, he became professor of anatomy, surgery, and obstetrics in Jena. During the years 1780 and 1781 he traveled in France, England, and Holland, and in 1803 he became professor of anatomy at Halle. After the occupation of this city by the French, in 1806, he went to live at Königsberg. In 1809 he moved to Petersburg and Moscow and became professor of anatomy and surgery at the University of Moscow. He died on April 4, 1832. The Russian government bought his anatomic collection for fifty thousand silver rubles.

The Bureau of Provincial Industries (*Landes-Industrie-Comptoir*), founded in 1792 by Friedrich Justin Bertuch, of Weimar (1748–1822), had already engaged a great many artists, and now facilitated the undertaking which we are about to discuss and which Loder began in 1794. Its object was the compilation in one work of all the best representations then known in all the different branches of anatomy, supplemented by representations of original preparations. The work was completely carried out and is known under the title:

Anatomische Tafeln zur Beförderung der Kenntniss des menschlichen Körpers. (Also with Latin text instead of the German: *Tabulae anatomicae.*) *Weimar, im Landes-Industrie-Comptoir,* 1794–1803, fol., 6 parts, plates and exposition, 1 part alphabetical index, or 2 vols., text (exposition and index) and 2 vols. of plates, Weimar, 1803, 1804, fol., Vol. I: Plates I–XC, Vol. II: Plates XCI–CLXXXII.

The work consists of the following parts: I, osteology with fifteen plates after Walter, Albinus, Sue, John Hunter, Cheselden; II, syndesmology with ten plates after Albinus and Bonn; III, myology with twenty-six plates after Albinus, Zinn (the eye), Haller (the diaphragm), Gerlach and Monro (the pituitary gland), and Prochaska (the muscle fiber). The first six plates of this part are accompanied by outline-plates. IV, splanchnology with thirty-nine plates after Albinus, William Hunter, Ruysch, Haase, Ludwig, Ledermüller (the sense of touch), Haller, Ruysch, Albinus, Duverney, Cassebohm, Scarpa, Cotugno, Zinn, Walter, Reil, Wrisberg (the senses of smell, hearing, vision, and taste), Santorini, Siebold, Cheselden, Ruysch, Leveling, Sandifort, Lieberkühn, Hedwig, Haller (the digestive organs), Schumlansky, Camper, Röderer, Albinus, Haller, Santorini, Wrisberg, John and William Hunter, Wagler,

Tolberg, Wrisberg (urinary organs, genitals, and fetus); V, angiology with sixty-two plates, on some of which the arteries appear illuminated, after Ruysch and Wolf (the heart), Haller (the arteries), Vicq d'Azyr (on the vessels of the brain), Walter and Janke (on the veins), Mascagni (on the lymphatics); VI, neurology with thirty plates, three of which are supplemented by outline-plates, after Vicq d'Azyr (the brain), Huber and Scarpa (the spinal cord), Meckel, Scarpa, Asch, Peipers, Andersch, Neubauer, Walter, Schmidt, Camper, Fischer, Reil, Monro, Haller, Albinus (the nerves). Each part contains also a considerable number of figures drawn from Loder's original preparations; an especially large number of these figures may be found in the syndesmologic part of the book, but none of the other parts is without some. Of the 143 figures on 182 plates, 1,122 are copies and 309 original drawings made after preparations. As draftsmen of the latter, the following are named: Johann Carl Bock, of Nuremberg, Starke, of Jena, and Jacob Roux, of Jena. Only the first two men are also given as the engravers of some plates. The other engravers are Johann Stephan Capieux, of Leipzig (b. Schwedt on the Oder 1748, d. Leipzig 1813), Johann Christian Ernst Müller, of Weimar (b. Troisted in the grand duchy of Weimar, d. 1824), Friederich Müller, of Weimar, Daniel Beyel (b. Zürich 1760), Westermayr, of Weimar, Samuel Gränicher, of Dresden (b. Zoffingen in the canton of Berne 1758, d. 1813 at Dresden), Volkart, of Nuremberg, Bock, Junior, of Nuremberg, Johann Friederich Schröter, of Leipzig (b. Leipzig 1771, d. Leipzig 1836), Johann Nussbiegel, of Nuremberg (b. Nuremberg 1740), A. Weise, of Jena, C. Graf, of Weimar, Friederich Kaiser, of Weimar (b. Ulm 1779, d. Vienna 1819), J. B. Hössel, of Weimar. The figures are carefully selected and mostly very well drawn but all larger figures are reproduced on a smaller scale.

At the request of some buyers of the book a portrait of Loder was later inserted, engraved by Johann Gotthard von Müller, of Stuttgart, in 1801. Another portrait, engraved by Johann Daniel Laurens, of Berlin, may be found preceding Vol. XCI of the *Allgemeine deutsche Bibliothek*. Both are done after a painting by Johann Friederich August Tischbein.

See also Justus Christianus a Loder: *Index praeparatorum aliarumque rerum ad anatomen spectantium, quae in Museo Caesareae Universitatis Mosquensis servantur, Mosquae*, 1823, large 8°. (This work, which was never for sale in the book-trade, contains also the text in Russian on the opposite pages; there are 4,451 preparations.)

Heinrich Karl Laurenty: *Erinnerung, Urkunde und Denkblätter zum Kranze der 50 jährigen Jubelfeier des Med. Dr. J. C. v. Loder*, Riga, 1828, 8°.

LEOPOLDO MARCO ANTONIO CALDANI

Leopoldo Marco Antonio Caldani, physician and anatomist, was born at Bologna on November 21, 1725, and died on December 30, 1813. He obtained his doctor's degree in medicine on October 12, 1750, and in 1758 became a pupil of Morgagni at Padua. In 1760, he took the chair of anatomy in Bologna, but soon went to Venice. He became professor of theoretical medicine at Padua, and, in 1771, professor of anatomy, succeeding Morgagni, and occupied these chairs till 1805. In his later years, he was aided in his anatomic and literary works by his nephew, Floriano Caldani, a professor in Padua. Together they edited the second large compilation which, like Loder's work, comprised the best anatomic representations of past periods. They are:

Icones anatomicae, quotquot sunt celebriores, ex optimis neotericorum operibus summa diligentia depromtae et collectae. Tabulas selegerunt et nonnullas ex cadaveribus ad vivum delineatas addere curarunt L. M. A. et Fl. Caldani. (*Tabularum anatomicarum Pars prima. Ossa et Ligamenta. Tab. 1–51.*) *Vol. I.—Icones anatomicae ex optimis*, etc. *collectae opera et studio*, etc. (*Tabularum anat. Pars altera. Musculi et Bursae mucosae, Organa sensuum et viscera. Tab. 52–134.*) *Vol. II.—Icones*, etc. (*Tabular. anat. Pars tertia. Uterus gravidus, Embriones humani, Cor, Arteriae, Venae. Tab. 135–204.*) *Voluminis III. Sectio prima.—Icones*, etc. (*Tabular. anat. Partis tertiae Sectio altera. Vasa lymphatica, Cerebrum, Nervi. Tab. 205–264.*) *Voluminis III. Sectio altera. Venetiis, ex calcographia Josephi Picotti*, 1801, 1804, 1810, 1813, large fol., 4 vols.

Iconum anatomicarum explicatio. Pars prima. Partis secundae Sectio prima et altera. Partis tertiae Sectio prima et altera, Venetiis, 1802, 1804, 1805, 1808, 1814, fol., 5 vols.

The latter consists of five volumes of which the second and third (*Partis* II. *Sectio* 1. 2.) refer to the second volume of the plates (*Pars altera*), the first, fourth, and fifth volumes to the first, third, and fourth volumes of the plates (*Pars prima Partis tertiae Sectio 1. et 2.*), thus leaving two volumes of exposition for the second volume of the plates. In the *Icones*, each finished plate is supplemented by an outline-plate, with the exception of Hunter's and Soemmerring's plates in the third volume, in which the outline-plates have been omitted, just as with the

original plates. In the first volume, there is a large allegoric copper-title picturing a landscape, and the opening of a cadaver, without the name of the artist and engraver, and with two connected medallions, the portraits of the two editors. This is followed by two plates, each of which is accompanied by an outline-plate. They represent a nude male body (Apollo Belvedere) and a nude female body seen from the back and from the side. The first is drawn and engraved by Cajetano Bosa; the second is engraved by him, but drawn by Francesco Gallimberti. The anatomic plates begin with a histologic plate, from original preparations and after Albinus, Monro, Scarpa, and Cruikshank. Then follow representations of the bones after Albinus, the female skeleton after Soemmerring, the teeth after John Hunter, the ligaments after Floriano Caldani's work, which will be mentioned later. The second volume contains representations of the muscles after Albinus, the diaphragm after Haller, the bursa mucosa from original preparations and after Loder, the skin from original preparations and after Ruysch, Ledermüller, Albinus, William Hunter, Haase, Ludwig, Loder, the eye after Zinn and Soemmerring, the ear from original preparations and after Ruysch, Duverney, Cotugno, Albinus, Scarpa, the olfactory organ from original preparations, and after Ruysch, Haller, Mayer, Scarpa, the tongue from original preparations, and after Albinus, the viscera from original preparations, and after Siebold, Santorini, Loder, Ruysch, Cheselden, Haller, Leveling, Sandifort, Albinus, Lieberkühn, Hedwig, Bleuland, Walter, Schumlansky, the sexual organs and the fetus after John Hunter, Sandifort, Wrisberg, Loder, Ruysch, Santorini, Camper, Roderer, Albinus, Haller, Kölpin, Tolberg. The third volume comprises representations of the pregnant uterus and the embryos by William Hunter and Soemmerring; the heart from original preparations and after Ruysch, Haller, Wolf, and Loder; arteries and veins after Haller, Scarpa, Walter; the portal vein from an original preparation; the thoracic duct after Albinus. The fourth contains the lymphatics after Mascagni, the brain after Vicq d'Azyr, Gall, and Spurzheim, the nerves from original preparations and after Meckel, Hirsch, Asch, Lobstein, Bang, Scarpa, Walter, Fischer. All the original preparations were prepared anatomically by the younger Caldani and drawn from nature by Cajetano Bosa. Most of the anatomic plates were engraved by Francesco Ambrosi and Felice Zuliani, of Venice. A few of the plates were engraved by Ferdinando de Martiis, Francesco dal Pedro, Pietro Zuliani, Giovanni Battista Torcellano de Murano, Perini, and Butafoco. All the plates are beautifully finished in the size of the originals.

The two Caldanis were the authors of anatomic works, viz.:

Leopoldo Marco Antonio Caldani: Institutiones anatomicae. Tom. I. II. Venetiis, 1787, 8°; *Napoli*, 1791, 8°; *Lipsiae, sumtu Casp. Fritsch*, 1792, 8°; Italian by Castellani, Brescia, 1807, 8°, with 7 copperplates.

Leopoldo Marco Antonia Caldani: Memorie lette nell' Accademia di scienza, lettere ed arti di Padova, Padova, 1804 sq. 4°, with copperplates.

Floriani Caldani: Tabulae anatomicae ligamentorum corporis humani, Venetiis, ex calcographia Josephi Picotti, 1803, large fol., with 11 finished and 11 outline-plates.

These were drawn from nature by Cajetano Bosa, engraved by Francesco Ambrosi and Felice Zuliani. A very excellent and complete work which has been wholly included in the *Icones anatomicae, Vol. I. Tab.* 41–51, is

Floriani Caldani: Riflessioni sull' uso dell' anatomia nella pittura, Venezia, 1808, 4°—French translation by H. Kühnholtz: *Reflexions sur l'Anatomie appliquée à la Peinture, traduites de l'Italien et accompagnées d'un Avantpropos et de Notes sur le même sujet.* Montpellier: Louis Castel, 1845, 8°, 52 pp., without illustrations (contains many literary references).

TURKISH ANATOMY

The conception of a textbook of medicine containing anatomy with illustrations is a feature of modern times, in which people began to depart from the orthodoxy of Islam in many ways, and also in this connection. The Turkish Printing Office existed in Constantinople from the year of the Hegira 1139 (1726–27 A.D.), but was closed from 1755 to 1784, and turned out some sixty works up to 1819. In the year of the Hegira 1231 (1815–16 A.D.), the Ulema Schani Zadeh (whose complete name is Schani Zadeh Mehemmed Ataullah and who had studied in Italy) published a medical work under a title which, translated, would be something like this:

Mirror of the structures in the anatomy of the parts of the human body. Printed at Scutari. Year of the Hegira 1235, 1820 A.D., fol., with fifty-six copperplates.

The work comprises about 300 pages of text and consists of three parts, viz.: I, anatomy beginning with the bones, then the muscles and the anatomy of the eye, the uterus, the ovum, and the fetus, finally the brain, the blood vessels, the nerves, and the glands; II, physiology and general pathology; III, special pathology and therapy, concluding with pharmacology. The technical terms are mostly Arabic, often Greek or Latin. The poorly engraved illustrations are not drawn from nature, but copied from Occidental models. A specimen illustration is given in the book mentioned below. For the publication, a special *Khattischerif*, a permit from Sultan Mahmud, was needed. The author had presented his work to him in the year of the Hegira 1231 (1815–16 A.D.). Through the French embassy in Constantinople, a printed copy of it came into the possession of the Royal Library of Paris.

These notes were taken from T. X. Bianchi: *Notice sur le premier ouvrage d'anatomie et de médecine imprimé en Turc à Constantinople en 1820, intitulé Miroir des corps dans l'anatomie de l'homme, envoyé et offert par S. Exc. l'ambassadeur de France près la Sublime Porte à la bibliothèque du Roi. Suivi du catalogue des livres turcs, arabes et persans, imprimés à Constantinope, depuis l'introduction de l'imprimerie en 1726–27 jusqu' en 1820. Paris, impr. L. T. Cellot,* 1821, 8°, containing 40 pages and 4 lithographic sheets, 1 piece of Turkish text and a specimen of the illustrations (face and arm muscles).

GIOVANNI BATTISTA DE RUBEIS

Giovanni Battista de Rubeis came from the patrician family De Rossi, of Udine, and received an academic education, but turned to arts and studied first at the Academy of Arts at Venice, later under Ercole Lelli in Bologna (cf. p. 294). He afterward went back to Udine and gained fame as a portrait painter. He was born about 1750 and died about 1810. Besides a treatise on portraits or the art of observing physiognomy, he wrote also a treatise on anatomy for the use of artists. Both were published in Italian, with the French translation at the side of the text, under the title:

Giovanni Battista de Rubeis: Trattato dei ritratti ossia trattato per coglier le fisionomie. Trattato d'anatomia per uso dei pittori. Parigi, 1809, 4°; *J. B. de R.: Traité des portraits ou traité pour saisir la physiognomie. Traité d'anatomie à l'usage des peintres*, Paris, 1809, 4°, with illustrations.

GIUSEPPE DEL MEDICO

Giuseppe del Medico was the author of a manual of anatomy for artists. Cicognara (*catal.*) mentions it with particular praise and his book is thought to have been introduced at the Academy of Arts in Rome.

Anatomia per uso de' pittori e scultori di, Giuseppe del Medico professore di chirurgia, Roma, MDCCCXI. presso Vincenzo Poggioli, fol., contains eighty-four pages and thirty-eight copperplates. [Between pages 4 and 5 of the text is inserted an unnumbered page, a dedication *alla insigne accademia di San Luca.* The copperplates all have the explanations engraved on them and are either simply black (as Plates I–III, XXXIV, XXXV), or printed in two colors (as Plates XIV–XXXIII) with the bones black and the muscles red-brown, or in three colors, black, brown, and light-blue (as Plates XXXVI–XXXVIII). In some cases the brush seems to have been used for touching up. The illustrations are, on the whole, good and correct as to anatomy; Plates I, II, XIII contain whole skeletons, apparently after Albinus, Plates III–XII bones, Plates XIV–XXXIII muscles, Plates XXXIV, XXXV two views of the Borghese Gladiator, Plates XXXVI, XXXVIII internal organs.]

There exist copies of the prints on colored paper, struck off from two separate color plates.[1]

[1] A copy is in the Surgeon General's Library at Washington, D.C.

JEAN GALBERT SALVAGE

Jean Galbert Salvage received his doctor's degree at Montpellier and was military surgeon with the armies in the field until 1796, later, in the same capacity, in the military hospitals at Paris. After many studies, he published a most valuable work which was adopted by the French government for use in the graduate schools, but which seldom appeared in the market and, therefore, is now rare. Its title is:

Anatomie du gladiateur combattant, applicable aux beaux arts, ou Traité des os, des muscles, du mécanisme des mouvemens, des proportions et des caractéres du corps humain. Ouvrage orné de 22 planches. Par Jean Galbert Salvage, docteur en médecine de la faculté de Montpellier. Paris, chez l'auteur, de l'imprimerie de Mame, 1812, large fol., 10 and 64 pp. and 22 folio copperplates, mainly in black and red.

The title is preceded by two pages, a bastard-title, on the back of which the Parisian booksellers, Le Normant, Treuttel et Würtz, and Bance, *l'ainé*, advertise themselves as the distributors of the work, and a dedication *aux manes d'Agasias, fils de Dosithée et citoyen d'Ephèse, auteur de la statue du gladiateur* ("to the Manes of Agasias, son of Dositheus and citizen of Ephesus, author of the statue of the gladiator"). Then follows the principal title and four pages of introduction. The text begins with a detailed treatise on osteology and myology. Beginning with page 35, the other treatises mentioned in the title of the book follow. The book contains 21 plates besides the copper-title. They are all drawn by Salvage, and fifteen of them, the finest among the collection, were engraved by Bosq. The first and the nineteenth of the numbered plates bear the signatures, *N. Outkine* and *Outkin*, certainly Nicolaus Outkyn (Outkin), the director of the Academy of Arts of Petersburg. The sixteenth and seventeenth are signed, *Sculpsit J. Wolffsheimer, perfecit Bosq.* The twentieth plate is signed, *Sculpsit Cor. peregit Bosq;* the eighteenth *Dorêz Sculpsit.* The plates numbered I–XX are preceded by a *Planche d'instruction*, which represents individual bones and a muscle and has no number. Consequently there are 21 plates in the text, the twenty-second being the copper-title. Of the last twenty plates, the first represents bones and muscles of the head and the neck of Apollo Belvedere. The second plate represents, in the same way, another head and the eye; the third and fourth plates show

the forearm and the hand, the leg and the foot. The following eleven plates show a skeleton of the statue of the gladiator and a complete muscleman, with the superficial and deeper muscle-layers, viewed from four different sides. On the whole, these are well and correctly drawn, though showing some arbitrary treatment as to details, especially in osteology. These are followed by two plates which serve to illustrate

the mechanism of muscular motion. A third plate serves to illustrate body movements in general, a fourth shows the proportions of the male, the female, and the child's body. The last plate is designed to present differences due to age and represents in finished figures the Apollo of Florence, the Apollo Belvedere, Silenus and the infant Bacchus, and the Farnese Hercules, all without anatomy. The *Planche d'instruction* and the fifteen plates immediately following it are struck off from two plates so as to bring out the bones in black and the body contours and muscles

in red, similar to the method successfully used before by J. H. Lavater (cf. p. 310). The text engraved upon the plates had been distinguished in a like manner. Copies on vellum could be had at double the cost of the regular copies, or 160 francs, and with the counter-proofs, at 200 francs. The ordinary copies cost 80 francs, and with the counter-proofs 100 francs.

[Of his work on the Borghese Gladiator, Ottfried Müller says: "No work is better fitted to convey conveniently to the archaeologist information on the essentials of osteology and myology than J. G. Salvage's *Anatomie du gladiateur combattant*" (*Handbuch der Archäologie der Kunst*, edition 2, 1835, § 328, note 4). Cf. Lessing: *Laokoon*, § 28, and *Antiquarische Briefe*, letters 35–39 (edition Göschen, Leipzig, VI, 203; Vol. V, 459); Weigel: *Kunstkatalog* no. 18264.]

Ebert: No. 20145.

GIAMBATTISTA SABATTINI

Giambattista Sabattini, physician and professor of anatomy at the Academy of Fine Arts in Bologna, published a very valuable anatomy for graphic and plastic artists under the title:

Tavole anatomiche per li pittori, e gli scultori di Giambattista Sabattini, dottore in medicina, e chirurgia, professore d'anatomia nella Reale Accademia di belle arti in Bologna, membro della Commissione dipartimentale di sanità del Reno, medico-chirurgo maggiore sostituto nel grande Spedale della vita, e morte, etc. *Bologna, tipografia dei fratelli Masi,* 1814, large 4°, 87 pp. and 48 copperplates.

The latter show very excellent workmanship and anatomic accuracy and correctness. The first four plates represent the front and back views of a male figure, finished and in outline, with explanatory letters. The following plates have osteologic representations of special organs, with the myologic representations, also finished and in outline. Sixteen plates pertain to the trunk and the head, twenty-eight to the upper and lower extremities. There are altogether forty-eight plates, some of them having one figure, others with several figures. But they are numbered from one to twenty-six because, beginning with the fifth plate, the outline representations always have the same number as the corresponding finished plate. They were all drawn by Giuseppe Guizzardi, and engraved by Antonio Gajani (born at Bologna, a professor of the art of copper engraving in Modena). The work is rare, and one should take care that all plates are included in his copy, and guard against having some plates double and others missing, since it appears that transpositions of sheets occurred. Each finished plate should always be accompanied by an outline-plate with lettering. The text contains only explanations of the plates, but, in the preface, the author promises the publication of a separate *Trattato teorico osteologico e miologico* for the use of artists. This treatise, however, seems not to have been published, while an abridged and less expensive, but inferior edition of the anatomic plates appeared under the title:

Tavole anatomiche per li Pittori e gli Scultori ricavate dall' opera insigne del celebre Giamb. Sabattini—disegnate dal rinomato pittore Bolognese Gius. Guizzardi. Lavoro ridotto dall' incisore Luigi Rados a sole 17 tavole, contenenti 20 figure osteologiche e 20 miologiche colle rispettive

descrizioni ne' rami, dedicato a particolare utilità de' giovani Artisti, Milano, presso Antonio Bossi e Gio. Silvestri, s.a., oblong folio, 20 leaves all in copper.

The title is followed by two more pages of text: *Piano dell' opera* and *Discorso preliminare*, and by seventeen engravings. The first two represent the front and back views of the male body; the remaining fifteen plates each contain one or more myologic with the corresponding osteologic figures. Most of the plates were engraved by Gaetano Bonatti, except Numbers III and IV which were executed by Luigi Rados, an engraver of Parma.

[Weigel: *Kunstkatalog*, no. 18265–66.]

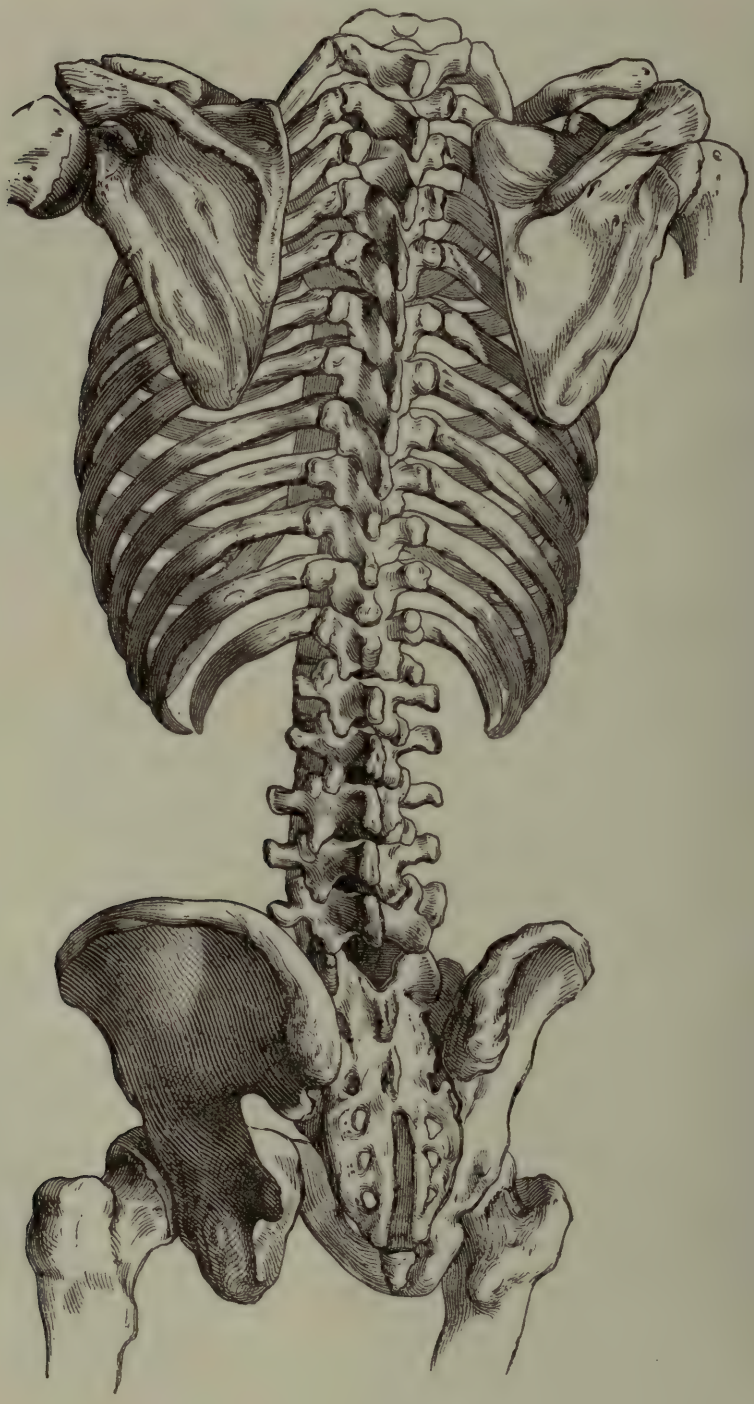
GIUSEPPE BOSSI

Giuseppe Bossi, draughtsman and painter, is particularly famous for his drawings and has also become known for his great admiration for Dante and Leonardo da Vinci. He made the first arrangements and all the preparations for Giacomo Raffaelli's mosaic copy of Leonardo da Vinci's "The Last Supper" for the Belvedere at Vienna. He was born at Busto Arsizio, in the territory of Milano, in 1776 or 1777, and died at the Villa Melzi, on Lake Como, in 1816. After his death, was published:

Tavole anatomiche disegnate dal Pittori Giuseppe Bossi ora per la prime volta pubblicate sotto la Direzione del Pittore Giuseppe Sogni, Professore d'elementi di figura presso l' J. R. Accademia di belle arti, e del Pittore Giovanni Servi, Aggiunto al Professore suddetto. Milano, presso la litografia Brison e Corbetta, s.a., large fol.; lithographed cover and title and 20 lithographed and illuminated plates.

The different parts of the human body are represented almost in life-size and are very valuable, both from an artistic and an anatomic standpoint. The least valuable of them all is perhaps the first plate representing head, neck, and shoulder. Each myologic representation is supplemented on the following page, or, if space permits it, on the same plate, by an osteologic representation, showing the same parts in the same position. The extremities have been given the most conscientious treatment and take up all of the remaining fourteen plates. Most of the plates are signed, *Giuseppe Bossi disegno dal vero*, but the purely osteologic plates (II, IV, and VI) are without this signature. Plate IV is signed *C. Sommariva dis. dal vero*, who is also the lithographer of the cover. Gallina is given on most of the plates as the lithographer. On many *Carlo Porro esegui* or *dis. sulla pietra.* are added to Gallina's name. Giuseppe Sogni was a Milanese painter and was born about 1800. Giovanni Servi of Venice was born about 1795 and was a painter at Rome, later at Venice and Milano. On the following page an illustration from this work has been reproduced.

[Weigel: *Kunstkatalog*, no. 18267.]



KOECK

Koeck, a professor at the Academy of the Graphic and Plastic Arts at Munich, was the author of:

Anatomische Abbildungen des menschlichen Körpers für bildende Künstler, with 12 executed plates; Munich, 1822, fol.

The plates are lithographs showing remarkably beautiful execution and finish. They represent bones, ligaments, and muscles. The text contains only explanations of the figures. The scale chosen is not too small, and the selection recognizes the needs of artists. Owing to these facts and to the anatomic accuracy, the beauty of the drawings, and the inexpensiveness of the book, this atlas is one of the most useful works in its line.

[Christian Köck, who illustrated Sömmerring's works, is apparently not the same man. He died in 1818.]

GEORGE SIMPSON

George Simpson, surgeon and a member of the Royal College of Surgeons of London, taught anatomy to a London society of artists, organized for the study of that phase of anatomy suitable to their needs (The Artists' Anatomical Society), and published, to this end, the following book:

The anatomy of the bones and muscles, exhibiting the parts as they appear on dissection, and more particularly in the living figure; as applicable to the fine arts. Designed for the use of artists, and members of the Artists' Anatomical Society. In two parts. Illustrated with highly finished lithographic impressions. London: printed for the author, by J. Johnson, 1825, large 4°, 13 and 141 pp. and 30 lithographed plates in 4°.

The first (osteologic) part of the work contains 13 plates representing different parts in natural size and a fourteenth representing the skeleton on a reduced scale. The drawings were made by Cooley and lithographed by L. Haghe. The second (myologic) part contains 16 plates of which only the four representing the hand and the foot are in life-size, while others are drawn on a different and smaller scale. The drawings made from nature are by William Henry Brooke (also Brook) and by John Taylor Wedgwood. They are lithographed by J. W. and C. Newcombe, W. Fairland and R. Thomas Stothard. The three last plates represent the entire muscleman after Albinus. All are finished in crayon on India paper. The life-size figures are remarkably beautiful and true to nature, the smaller figures and copies less so. One shortcoming is the fact that differences of sex and age have not been taken into consideration. The text is splendidly printed. The work is dedicated to the painter Thomas Lawrence (b. Briston 1769, d. London 1830).

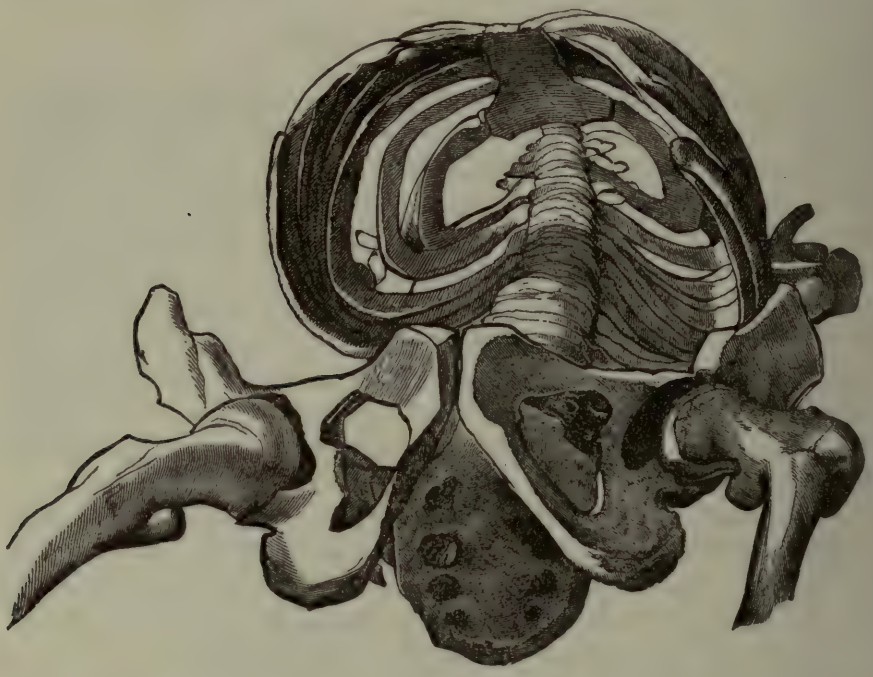
JOHN FLAXMAN

John Flaxman, sculptor, was born at York in 1755 and died at London in 1826. He left a number of anatomic studies treating of the skeleton, the muscles of the trunk, and the extremities. They show, in their sequence, a certain completeness which is carried out more fully in the myologic part than in the osteologic, but which, nevertheless, at the time of their planning, had not been thought of. Nor had these studies ever been intended to serve as a textbook of anatomy for artists. They were collected after Flaxman's death, arranged on 19 plates, and were given the necessary reference letters for the different bones and muscles. Two other plates, drawn by W. Robertson, with an explanatory text, were added to them, and the whole collection published under the title:

Anatomical studies of the bones and muscles, for the use of artists, from drawings by the late John Flaxman, engraved by Henry Landseer; with two additional plates and explanatory notes by William Robertson. London: M. A. Nattali, 1833, large fol., with a portrait of Flaxman, etched by M. de Clauson, and 21 anatomic plates; 6 printed leaves.

The first two plates were drawn and lithographed (not engraved on copper) by Robertson and contain six whole figures, viz.: the skeleton and the muscleman, each from three different viewpoints. The proportions are good, and the drawing, although less accurate in the details, meets the needs of artists. The nineteen plates following these were drawn by Flaxman and engraved by Landseer. The first three (Plates III–V) are finished in aquatint and pertain to osteology. They represent the trunk with the head and a part of the extremities, as well as the pelvis in different positions and a difficult foreshortening. No completeness seems to have been intended. The sixteen plates following (VI–XXI) are done in the easy, unconventional style of chalk-drawings and pertain wholly to myology. They represent the head, trunk, and extremities in various positions, movements, and foreshortenings. Some of them seem to have been only studies for some planned work, yet this group is more complete. Flaxman's drawings are all unconventional, clever, and true to nature. But to use them the artist must already possess a knowledge of the anatomy of bones and muscles, with which, to a certain extent, the two plates by Robertson are intended to furnish

him. The text contains nothing by Flaxman; it is rather an index by Robertson to the names of bones and muscles and the origins and



insertions of the latter. The work is splendidly gotten up and rare in Germany.

Cf. *Œuvres de Flaxman gravés au trait par Revil*, Paris, 18—, 8°.
Weigel: No. 13522.

[SIR CHARLES BELL

Sir Charles Bell, the author of an original and notable work on the anatomy of expression in painting, was born at Edinburgh in November, 1774, the exact date of his birth being unknown. He died at Hallow Park, April 29, 1842. Early in life he gave evidence of ability as a practical dissector, anatomist, and surgeon, making his own beautiful drawings in his own inimitable way. His various essays on the nerves of the face, and his illustrations of these nerves under disease, are of the highest importance and deepest interest, and the greatness of the work can only be realized when compared with what was known, or rather not known, in his day of the physiology of the nervous system. His various systems of anatomy, dissections, and surgery, still stand unrivaled for facility of expression, elegance of style, and accuracy of description. The plates are all from drawings made by the author. The Library of the Surgeon General's Office, Washington, D.C., is in possession of a volume of his original water-color sketches. His first publication was entitled:

Essays on the anatomy of expression in painting, London, 1806, 4°, with illustrations.

In this work he points the importance of a knowledge of anatomy to the artist and displays the error into which artists may be betrayed by an exclusive attention to the antique. He treats of the skull and form of the head, of the muscles of the face in man and in animals, depicts the several passions by a comparison of these, marks what is peculiar to man, embodies the idea of a living principle in the expression of emotion, and finally treats of the economy of the living body as it relates to expression and character in painting. The illustrations show some of the finest specimens of his pencil. A second edition, with additions, was published in 1824, 4°. The title was changed in the third and succeeding editions to:

The anatomy and philosophy of expression as connected with the fine arts, London, 1844, 8°.

Many Latin quotations and several illustrations were left out and the work was practically re-written, so that this edition is really a new work. The seventh edition appeared as late as 1893.

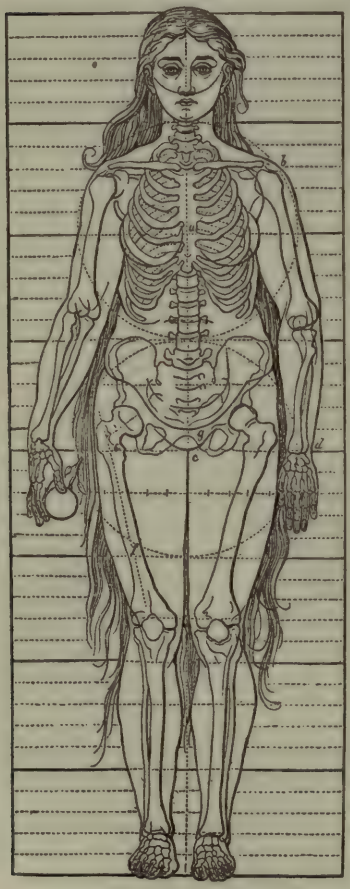
Weigel: No. 18693.

Pettigrew (Thomas Joseph): "Sir Charles Bell"; *Memoirs of Physicians, Surgeons*, etc., London, 1839,

Corson (Eugene R.): *Johns Hopkins Hospital Bulletin*, Baltimore, XXI (1910), 171–82; XXV, 185–89. *Tr. XVII. Internat. Cong. Med.* 1913, *Lond.*, 1914, *Sect. XXIII*, 73–86.]

BURKHARD WILHELM SEILER

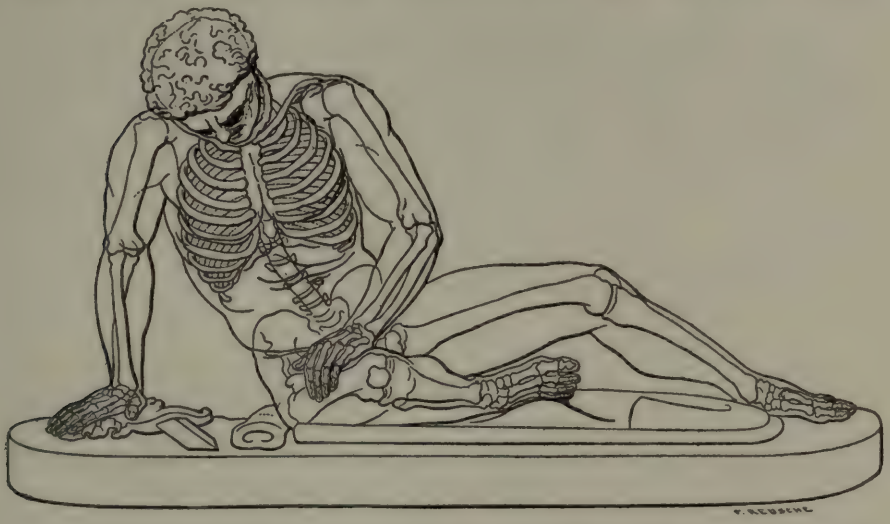
Burkhard Wilhelm Seiler, anatomist and physiologist, was born at Erlangen on April 11, 1779, and died at Freiberg on September 27, 1843. In 1802, he became prosector in Wittenberg, and from 1807 until the closing of the university he was professor of anatomy, physiology, and surgery there. In 1815, he became professor of anatomy and physiology and director of the Medico-Chirurgical Academy of Dresden. Of his works the following one is in line with our discussion:



Anatomie des Menschen für Künstler und Turnlehrer von B. W. Seiler. Herausgegeben von A. F. Günther, Professor, etc. With 8 copperplates in large imperial folio and 1 lithographic plate, representing the skeleton and muscles of the horse; Leipzig: Arnold, 1850, 8° and fol.

At Seiler's death only the first volume, containing the first four copperplates and explanations, had appeared in 1826, while the other four had been engraved but were still without numbers or text. August Friedrich Günther, Seiler's pupil and assistant for many years, director general of the Army Medical Department and professor at the Medico-Chirurgical Academy (succeeding Seiler there), undertook the difficult task of finishing the work, adding to it the lithographic plate pertaining to the horse, and the explanatory text. The work now has nine large plates. Dietrich Wilhelm Lindau (b. Dresden 1779), who later became famous as a genre painter in Rome, made the drawings for the copperplates. Johann Friederich Schröter (b. Leipzig 1771, d. Leipzig 1836) and Christian Ernst Stölzel (b. Dresden 1792) did the engraving, but

others, not named anywhere, aided them in the work. The drawing for the lithographic plate was made by M. Krantz. J. E. Assmann finished it on stone. The first plate is histologic, representing the tissues of the body, and is a very remarkable composition not to be found anywhere else, although it has little value for the graphic artist, who does not expect to become an anatomic artist and make anatomic representations. The second plate represents three views of the skeleton; the third the same views and positions in the muscleman. The fourth contains representations of the extremities, and the neck and head in various movements. The fifth shows three musclemen with the deeper muscle layers. The sixth consists of a few myologic figures of the trunk



and representations on a larger scale of the skull and the larynx. The seventh plate treats rather convincingly of the proportions, the skull-forms, and the differences due to sex and age. It also represents the body outline of the Venus dei Medici, the Meleager (Antinous), and the Apollo Belvedere. The eighth plate shows the contours of the Borghese Gladiator, the Dying Gaul in the Capitoline, the Laocoön without his sons, the Satyr, Farnese Hercules, the Crouching Venus (*Venere della chiocciola*), and of the Cymbal Player; all have the skeletons drawn inside the body outlines. The ninth plate represents the skeleton and the myology of the horse and, in a few accessory figures on a somewhat larger scale, the head of the horse. The wealth of the material given and the beauty of the very careful and faithful representations render this atlas a very useful tool in the hands of graphic and plastic artists. The

text (16 and 184 pp. 8°) not only contains explanations of the plates but also presents varied information regarding the structure and functions of the body.

Die Gebärmutter und das Ei des Menschen in den ersten Schwangerschaftsmonaten nach der Natur dargestellt, with 12 copperplates, Dresden: Walther, 1832, fol.

These twelve copperplates, two of them illuminated, and thirty-eight pages of text were published. The rest of the text is missing. The drawings for the plates were made from nature by Puschner of Dresden. The engraving was done by Johann Friederich Schröter, of Leipzig. Most of them represent microscopic subjects after investigations carried on for many years by Seiler himself.

Choulant (Ludwig): *Nachricht von dem Leben und Wirken B. W. Seiler's*, etc. With portrait and facsimile, Dresden, 1844, small fol.

Weigel: No. 17769[b].

PIERRE NICOLAS GERDY

Pierre Nicolas Gerdy, professor of anatomy, physiology, and surgery in the Faculty of Paris and surgeon at the Hôpital St. Louis and the Charité, was born at Locher (Aube) on May 1, 1797. He edited:

Anatomie des formes exterieures du corps humain, appliquée à la peinture, à la sculpture et à la chirurgie. Avec un Atlas, Paris, chez Bechet jeune, 1829, 8° and fol.; German: *Weimar, im Landesindustrie-Comptoir*, 1831, 8°, with 3 lithographic plates in 8°.

The book suffers from the opposition of the entirely different aims of the graphic or plastic artist and the surgeon. It shows on the other hand conscientious work, having particular reference to existing pictorial and sculptural representations. The plates of the German translation show an inferior workmanship and represent three complete bodies upon which the different parts and the muscles are indicated without anatomic exposure.

The work remained incomplete, as the author intended to follow this representation of the external forms of the body by an actual anatomy for artists.

EDUARD SALOMON AND CARL A. AULICH

Eduard Salomon and Carl A. Aulich, the former a physician, the latter an instructor in drawing for natural science and anatomy at the University of Leipzig, edited:

Anatomische Studien für Künstler und Kunstfreunde. Mit einem einleitenden Vorworte von Veit Hans Schnorr von Carolsfeld. With 9 lithographic plates, Leipzig: Gebhardt and Reisland, 1841, fol.

This work is based on Houdon's anatomical plaster statuette. The osteologic and myologic plates are very praiseworthy, not so the skeletons which are drawn superficially, vaguely, and arbitrarily. The representations of single organs on the ninth plate, besides being useless to the artist (at least as they are drawn), are not wholly correct anatomically. The printing of the finished plates is sooty. The text is copious, scientifically instructive, and not merely explanatory. Explanations are given separately. Schnorr was born at Schneeberg in 1764 and died in 1841 as director of the Academy of Arts of Leipzig, before the work had been finished.

FERDINAND BERGER

Ferdinand Berger, professor and instructor at the Royal Academy of Arts in Berlin, was the author of:

Handbuch zum Gebrauch für das anatomische Studium des menschlichen Körpers besonders für bildende Künstler und Dilettanten der Kunst. Berlin: C. G. Lüderitz, 1842, small fol., 15 pp., 10 copperplates and 2 lithographs in small fol.

All the illustrations were drawn and finished by the author himself. They include three skeletons and five musclemen after Albinus and four sketches of male bodies made from nature. A large number of posthumous sketches by Berger, partly studies in preparation for this work, partly other studies bearing on the knowledge of the human body needed by the graphic or plastic artist, are among the collections of the Medico-Chirurgical Academy at Dresden [Berger contributed to Schadow's work, *Lehre von den Knochen und Muskeln*, etc. Berlin, 1830, fol.]

JULIEN FAU

Julien Fau, doctor of medicine in Paris, edited two different anatomic works for artists:

Anatomie des formes extérieures du corps humain, à l'usage des peintres et des sculpteurs. Avec un Atlas de 24 planches dessinées d'après nature et lithographiées par M. Léveillé, élève de M. Jacob. Paris: Méquignon-Marvis fils, 1845 (16 and 214 pp.), 8° and fol. (24 lithographic plates), black and white and also colored.

The plates are very beautifully finished and comprise one plate of skulls of different nationalities; several different views of the nude bodies of a man, a woman, and a child, all drawn from nature, some of them supplemented by skeletons placed alongside of the bodies, with the body outlines; representations of the bones, and the muscles, the latter with the bones in some cases drawn in. Particular attention has been given to the various positions and flexions of the extremities. The last plate represents the myology of the Laocoön, without the sons, after Charles Clement Bervic's well-known print. This work has been translated into English, with additions, by the physician Robert Knox, and published under the title: *The anatomy of the external forms of man, intended for the use of artists, painters and sculptors*, London, 1848, 8°, with an atlas of 26 plates in quarto; published in black and white and also colored. The second, smaller, and less expensive work by Fau is:

Anatomie artistique élémentaire. Dessins d'après nature par J. B. Léveillé, gravures sur acier. Paris: Méquignon-Marvis, 1850, 8°, with 17 steel engravings in 8°, three of which are in small folio.

In this work the representation of the shapes of skulls, of the nude bodies, and of the Laocoön are missing, but representations of three beautiful skeletons, with the contours drawn around them, have been added. The remainder deals with osteology and myology, although less exhaustively than in the previous work.

The same author had a young artist, Eugène Caudron, a pupil of David d'Angers, make an anatomic plaster statuette, 70 centimeters high, for the use of artists (*nouvel écorché*) which is sold, white or colored, with a description and four pages of pictorial representations (the four views of the statuette), for 15 and 30 francs respectively (the description alone costs 3 francs). Prior to this, Johann Martin Fischer's plaster

statuette (cf. section, p. 321) had preferably been used by graphic and plastic artists in Germany, in Spain, that of Gaspar Becerra (b. Baeza 1520), in Italy, that of Luigi Cardi (called Cigoli or Civoli, b. Empoli 1536, d. Rome 1613), and in France, that of Jean Antoine Houdon (b. Versailles 1741, d. Paris 1828).

[To the anatomic statuettes for artists, mentioned here, there should be added that by Ercole Lelli (p. 294). Lelli also made, especially for Bologna, anatomic reproductions in wax for anatomists, i.e., reproductions of healthy or diseased parts of the human body, and two myologic figures in wood for the anatomic theater in Bologna. For three years Giovanni Manzolini worked with him and turned out even more splendid anatomic preparations in an especially prepared wax substance. After Lelli's death, in 1766, he worked by himself, but was assisted by his wife, Anna Morandi Manzolini, who gained even greater fame than he in this field and was visited by every tourist in Bologna, among them Emperor Joseph II. The large collection of anatomic wax preparations in the Specola of Florence was undertaken under the direction and after preparations and drawings by Felice Fontana (b. Palmavoli in Tyrol, April 15, 1730, d. Florence, March 9, 1805). He employed especially for this work the services of the artist Clemente Susini, and improved the composition of the wax substance used. Toward the end of the last century anatomic wax preparations were made by the artists Giambattista Manfredini and Alessandro Barbieri under the direction of the anatomist, Carlo Mondini of Bologna. Giuseppe Astorri is also given as the name of an artist active in this same specialty. In Germany, Heineman, of Brunswick, and his pupil Meves produced beautiful wax preparations of anatomy, of a rare detail and accuracy.]

Weigel: No. 17767–68.

WORKS ON ARTISTIC ANATOMY

A. MORE GENERAL WORKS

[These were compiled by Choulant in an attempt to render this literature complete.] They are either without illustrations, of small size and significance or were difficult to get in Germany.

[*Willem Goeree: Natuurlyke en schilderkonstige ontwerp der menschkunde.* Amsterdam, 1683, 8°; 1730, 8°, with illustrations after Vesalius; the author was an artist and wrote for the benefit of artists; he also wrote:

Jnleyding tot de praktyk der algemeene schilderkonst. Amsterdam, 1704, 8°, and *Jnleyding tot de algemeene teykenkonst, Amsterdam, 1705, 8°;* German translation by Filip von Zesen, Hamburg, 1669, 8°; cf. Haller: *Bibl. anat.*, I, 310; Weigel: No. 9795, 12166.

Scuola perfetta Per imparare a Disegnare tutto il corpo Humano Cavata dallo studio, e disegni De Caracci. Nouamente data alle stampe, s.l. et a., 4°, with the copper-title, 48 copperplates, representing heads and parts of the head; Plate VII represents two skulls. There are also illustrations of hands, feet, torso, and sketches made from the nude; Plates XVIII–XIX animal heads; Plate XXXIV a street with houses. Some of the illustrations are reproductions of well-known paintings. The following artists' names appeared on the plates: Lucas de Urbino, Annibale Carracci, Michelangelo Buonarroti, Agustino (Carracci), Marius Cartarius; most of them being probably the painters of the originals from which the copies were made. The drawing and engraving are valuable; there is no text.]

Johann Carl Wilhelm Moehsen: Verzeichniss einer Sammlung von Bildnissen, grösstentheils berühmter Aerzte; sowohl in Kupferstichen, schwarzer Kunst und Holzschnitten, als auch in einigen Handzeichnungen: diesem sind verschiedene Nachrichten und Anmerkungen vorgesetzt, die sowohl zur Geschichte der Arzeneygelahrtheit, als vornehmlich zur Geschichte der Künste gehören. With vignettes, Berlin: C. F. Himburg, 1771, 4°, 12, 243 and 240 pp.

Contains very valuable reports on artistic anatomy and the history of anatomic illustration. The copper vignettes have no reference to these subjects. Very accurate and conscientious research work is characteristic of this book, as of all of Moehsen's works.

Charles Monnet (Monet): Études d'anatomie à l'usage des peintres par Charl. Monnet, peintre du Roi, grav. par Demarteau, graveur du Roi, Paris ——— ?, large 4°, forty-two pages of copper engravings in red-chalk manner. Cf. Weigel: *Kunstkatalog,* no. 19935.

The illustrations were drawn by Monnet in the style of sketches or crayon drawings, and were engraved by Gilles Demarteau (d. 1776). They comprise osteologic and myologic representations of no particular value.

Gottlieb Friedrich Riedel: Abbildungen der Knochen und Muskeln des menschlichen Körpers nebst einer Erklärung und Benennung aller Theile in deutsch-latein- und französischer Sprache für junge Künstler und Wundärzte, Dessau, 1783, fol.; new title: Augsburg, printed by Herzberg, 1826, fol.

Containing three skeletons after Vesalius, two muscle-manikins after Albinus, and eight pages of text. The skeletons are engraved by Gottlieb Friedrich Riedel (b. Dresden 1724, d. Augsburg 1784), the musclemen are engraved by Johann Christoph Nabholz (b. Regensburg 1752, d. Leipzig about 1796). The anatomy is the reverse of excellent.

Bottmann: Cours d'anatomie à l'usage des artistes, Paris, 1788, 12°; *ibid.,* 1796, 12°.

This book has no illustrations. Cf. Cicognara: *Catal.*

[*Alexander Cozens: Principles of beauty, relative to the human head.* London, printed by James Dixwell, MDCCLXXVIII, large folio, 6 and 15 pages of printed English text; page 15 is followed by a title: *Principes de beauté, considerés rélativement à la tête humaine. Par Alexandre Cozens, Londres, imprimé par Jacques Dixwell,* M.DCCLXXVII., and the title of the French translation on fifteen newly numbered pages; at the end are 17 folio copperplates in brown representing parts of the head and complete heads, without proportional lines and anatomy. All are signed: *Alexander Cozens inven., F. Bartolozzi sculp.* Each illustration of a complete head is accompanied by a transparent page on which the hair, omitted on the plate itself, is especially represented. This makes it possible to see the head with the hair by placing the transparent page on the plate, and without hair by looking only at the copperplate. All the plates show beautiful sketching of characteristic heads.]

Gamelin: Nouveau recueil d'osteologie et de myologie à l'usage des peintres et sculpteurs, dessiné d'après nature, pour l'utilité des sciences et des arts, Toulouse, 1799, large fol., with copperplates.

The author was a French painter living in Carcassone.

Bosio: Traité élémentaire des règles du dessin, Paris, chez l'auteur et chez Tiger, an IX (1801), large 12°, 118 pp., including 17 copperplates.

The author was a pupil of David. The book treats only of the human figure and deals with osteology, myology, and proportions.

Charles Etienne Gaucher: Traite d'anatomie à l'usage des artistes. Paris———?

The author was a copper engraver and connoisseur, born at Paris in 1740, died there in 1803 or 1804. He was also the author of an *Essai sur la gravure.*

[*Tommaso Piroli: Raccolta di Studj come Elementi del Disegno tratti dal' Antico da Rafaello e Michelangelo. Con aggiunta di alcune Tavole Anatomiche. Il tutto publicatio ed inciso in 40 Rami da*, etc. *l'anno 1801. In Roma presso l'Autore*, s.a., fol., Weigel: No. 19317.

Johann Christian von Mannlich: Versuch über die Zergliederungskunde für Zöglinge und Liebhaber der bildenden Künste: with 8 copperplates, *München auf Kosten des Verfassers und in Commission der Lindauerschen Buchhandlung*, 1812, imperial folio, 6 pages of text and 8 copperplates of the same size as the pages. The text contains the explanation of the copperplates and a few general remarks, technical and historical; the copperplates represent front, back, and side views of the skeleton, besides the muscles of the trunk and individual limbs. The drawing throughout is very beautiful and true to nature. The skeletons are done in simple sharp lines with little crosshatching; the muscles in crayon style. Four myologic plates are signed: *N. Strixner sculp.*, although they are not otherwise distinguishable from the other plates. Albinus' illustrations served as a foundation for the skeleton, Houdon's statuette as a basis for the muscles. Sexual differences are nowhere considered. The author was the director of the Munich Galleries for Graphic and Plastic Arts. Weigel: No. 20633.]

Johann Christian Rosenmüller: Prodromus anatomiae artificibus inservientis, Lipsiae, 1819, 4°, 14 pp. without illustrations.

A *Prodromus* in which the author, professor of anatomy in Leipzig (1771–1820), presented the plan of a course of anatomy for graphic and plastic artists. The work itself was never published.

François Chaussier: Recueil anatomique à l'usage des jeunes gens, qui se destinent à l'étude de la chirurgie, de la médecine, de la peinture et de la sculpture. Paris, 1820, 4°, with illustrations—Edition 2: *Planches anatomiques à l'usage*, etc., *par Dutertre*, Paris, 1823, 4°.

Chaussier was born in Dijon in 1746, and died in Paris in 1828. As professor of medicine he lived first in Dijon, later in Paris. The purposes of the book are too numerous to render it a publication particularly appropriate to the needs of artists. The prints of the first edition are also by Dutertre.

Carl Gustav Adolph Theodor Förster: Quid anatomia praestet artifici, dissert. inauguralis, Berolini, 1821, large 8°, 75 pp., without illustrations.

The author was a physician and an instructor in anatomy at the Academy of Graphic and Plastic Arts in Berlin. The dissertation contains no new matter.

Leopoldo Uguccioni: Elementi di anatomia esterna, Milano, 1829, 8°, with 21 copper engravings and lithographic prints.

It is of little value, either from an artistic or an anatomic standpoint.

Jean Baptiste Sarlandière: Anatomie methodique ou Organographie humaine en tableaux synoptiques, avec figures. À l'usage des universités, des académies de peinture, etc. *Deux Parties avec 15 planches*, Paris, 1830, fol. Latin: *Anatomia methodica*, etc., Paris, 1830, 1831, fol.; with illustrations in black, 30 francs; with colored illustrations, 40 francs.

——— *Physiologie de l'action musculaire appliquée aux arts d'imitation*, Paris, 1830, 8°, 48 pages and 1 plate with 8 figures.

The author was a physician, born in Aix-la-Chapelle in 1787.

Halma-Grand: Quelques considérations sur les connaissances anatomiques applicables aux beaux arts, Paris: Dufey, 1830, large 8°, 7 and 47 pages, without illustrations.

The author was professor of anatomy, surgery, and obstetrics in Paris and urges some knowledge of physiology for graphic and plastic artists. He treats most exhaustively of human physiognomy.

Johann Gottfried Schadow: Lehre von den Knochen und Muskeln, von den Verhältnissen des menschlichen Körpers und von dem Verkürzen, In 30 Tafeln zum Gebrauch bei der Akademie der Künste. Berlin, 1830, fol.

——— *Polyclet oder von den Maassen des Menschen nach dem Geschlechte und Alter mit Angabe der wirklichen Naturgrösse nach dem rheinländischen Zollstocke.* Berlin, 1834, 4°, and fol. With German and French text and 29 outline-plates.

——— *Nationalphysiognomieen oder Beobachtungen über den Unterschied der Gesichtszüge und die äussere Gestaltung des menschlichen Kopfes. Als Fortsetzung des Werkes von Petrus Camper*, Berlin, 1835, 4° and fol., with German and French text and 29 outline-plates.

J. Lordat: Essai sur l'iconologie médicale, ou sur les rapports d'utilité qui existent entre l'art du dessin et l'étude de la médecine. Montpellier, *chez veuve Picot*, 1833, 8°, 16 and 296 pages.

In 1822 the medical faculty of Montpellier was presented with a rich collection of sketches of all schools, by Xavier Atger (d. 1833). Since 1829 the city of Montpellier has also owned Baron François Xavier Fabre's museum, a collection of paintings. [The historic painter

François Xavier Fabre was born in 1766 and died in Montpellier in 1831.] The book mentioned above tries to show how both these collections and the graphic arts in general, may be utilized in the study of medicine. In a special part (pages 49–142), it treats of the history of anatomic iconology and introduces a great many important notes pertaining to the general history of art. The book contains no illustrations. Its author was professor of physiology in Montpellier.

E. F. Verhas: Anatomie appliquée aux beaux arts, à l'usage des Académies de dessin, sculpture et peinture. Ontleedkunde toegepast op de beeldende kunsten, etc., *Bruxelles*, 1838, large fol.; 24 lithographic plates with French and Belgian Text.

The author was professor at the Academy of Art and Architecture in Termonde. Cf. Weigel: No. 8455.

[*Costantino Squanquerillo: Trattato di anatomia pittorica con analoga illustrazione. Roma, tipografia delle belle arti*, 1841, *A spese di Filippo Lustrini*, fol.

The printed title is followed by one blank page, sixty-four pages of printed text, and one lithographed title representing a skeleton and a muscle-manikin holding a plate on which a male and a female body are shown with their measurements; below is lithographed: *Trattato di anatomia pittorica Fatto da Costantino Squanquerillo Roma MDCCCXXXIX*. The lithographed title is followed by 64 lithographed plates of which Nos. I–LIII represent the bones and muscles of man, Nos. LIV–LVII internal organs, Nos. LVIII–LX proportions of the human body, Nos. LXI–LXIV bones and muscles of the horse. Plate LIII is without the artist's name, on the remainder *C. Squanquerillo* is given. Rosi is given as lithographer on six of the plates, Wieller-Martelli on eight, Martelli on twenty-six of them, and Battistelli on twenty-three; all were lithographed in Rome. Bones and muscles are given better than the internal organs. The lithographed title does not give the names of the artists.]

J. A. Wheeler: Handbook of anatomy for students of the fine arts. With illustrations in wood, London, Samuel Highley, 1846, 8°. With 10 pages of woodcuts. [The illustrations are done after Albinus on a very much smaller scale and comprise skeletons, musclemen, bones, and muscles. The 16 pages of text contain only explanatory terms printed by Bentley, Wilson, and Fley, London. It was published earlier under the title: *Hand-book for students of art, containing a description of the skeleton and the external muscles of the human figure;* with illustrations on wood, London, 1838, 8°; Weigel: No. 8456.]

Anton von Perger: Anatomische Studien des menschlichen Körpers für bildende Künstler. Vienna: Carl Gerold, 1848, large 12°; 8 and 36 pages. Without illustrations.

The author, the son of a painter and engraver, and himself trained in the art of painting, presents in this book a general view of the human figure and its proportions, detailed treatments of osteology and myology, and only the most essential points of the rest of the body, including also something on physiology.

Antonio Maria Esquivel: Tratado de anatomia pictorica, Madrid, 1848, 4°.

Carl Schmidt: Proportionsschlüssel. Neues System der Verhältnisse des menschlichen Körpers. Für bildende Künstler, Anatomen und Freunde der Naturwissenschaft; with 3 lithographic plates, Stuttgart: Ebner and Seubert, 1849, 8° and oblong folio.

The first plate contains two views of the male body, two views of the skeleton and a few smaller illustrations. The second represents a skull and head and also the hand and its bony structure. The third gives only measurements. The author bases his theory of the proportions on the points of support in motion. He was a historical painter and his opinion, as expressed on page 16, that the proportions of the mature female body differ from those of the male body only in the pelvis, is erroneous.

Carl Heideloff und Philipp Walther: Der kleine Anatome oder Handbuch des figürlichen Zeichnens zum Gebrauch der Vorbereitungsschulen und für Liebhaber dieser Kunst, Nuremberg: Riegel and Weissner, 1850, 8°, 18 pp. and 20 copperplates; the plates are lithographic.

This contains Albinian skeletons and musclemen, on a greatly reduced scale, also the head and extremities similarly reduced. Drawings of the external forms added are without anatomy. The illustrations of heads and extremities are the best. Heideloff calls himself "Royal Curator"; Walther signs himself as a painter and copper engraver and an instructor at the Commercial and Industrial School at Nuremberg. The cover shows Albrecht Dürer and Titian in their studies, both as complete figures. The text furnishes only explanatory terms.

[*Charactères des figures d'Alexandre le Grand et de Zénon le Stoicien, éclairés par la médecine par le Dr. A. Dechambre. Mémoire lu, pour la première partie, à l'Académie des beaux arts (Institut de France) le 22. Mai 1852*, Paris, 1852, large 8°; a treatise on two antiques in Paris, 35 pages, 1 lithographed plate representing a bust in 8°, and two small woodcuts printed in the text. Weigel: No. 19319.

Robert Knox: A manual of artistic anatomy, for the use of sculptors, painters, and amateurs, London, Henry Renshaw, MDCCCLII, 8°.

Twenty-eight and 175 pages with many woodcuts in the text, drawn by Westmacott representing skeletons, bones, muscles, and ligaments of single organs, proportions, national skulls, illustrations after antiques, such as Venus, Niobe, Hercules, Centaurs, and Lapithae, a bust of Memnon from the British Museum. The workmanship is excellent; printed by Thomas Harrild, London; Weigel: No. 19316.

——— *Great artists and great anatomists, a biographical and philosophical study*, London, 1822, 8°.

Contains an exhaustive biography of Georges Cuvier and Geoffroy St. Hilaire, a comparative biography of da Vinci, Michelangelo Buonarroti, and Raphael, and a treatise on the relation of anatomy to the graphic and plastic arts; Weigel: No. 180713.

Henry Warren: Artistic anatomy of the human figure. With 23 Illustrations. Drawn on Wood by the Author, and Engraved by Walter G. Mason. Ars probat artificem. London: Winsor & Newton, 1852, 8°, 64 pages.

The woodcuts represent the skeleton, the skull, bones and muscles of single organs; printed by Schulze, London, cf. Weigel: No. 18712.

Auszug aus Paul Zeiller's geburtshülflichem Hand-Atlas. Abbildungen über den Bau des weiblichen Skelets für Schüler der bildenden Kunst. München, im Verlage des Verfassers, s.a., large 8°. Six lithographed plates representing standing female bodies, from the front and back, and skeletons in the same positions with the body outlines sketched around them and the different parts numbered in red; Antinous and Venus with the skeletons sketched in. This book was published in 1852; the author was a preparer of anatomic specimens in Munich; Weigel: No. 18714.

J. J. Naue: Mimisch-Phrenologisches. Die Phrenologie im Verhältniss zur bildenden Kunst des Allerthumes und der Jetztzeit, with 14 lithographic illustrations, on two lithographic octavo pages; Cöthen 1853, 8°. Weigel: No. 19322.

George Combe: Phrenology applied to Painting and Sculpture, London, 1855, 8°, Weigel: No. 20631.

E. Harless: Lehrbuch der plastischen Anatomie. Enthaltend die Gesetze für organische Bildung und künstlerische Darstellung der menschlichen Gestalt im Allgemeinen und in den einzelnen Situationen; with illustrations after original drawings, Stuttgart, 1856, 8°, Weigel: No. 21017.]

[B. ADDITIONS ON THE PROPORTIONS OF THE HUMAN FIGURE

Pomponii Gaurici Neapoli / tani de sculptura. / Vbi agitur / De Symetriis, / De Lineamentis. / De Physiognomonia. / De etc. / De Claris Sculptoribus. / Ac plerisque aliis rebus scitu dignissimis; colophon: *Florentiae, VIII. Cal. Januar. / M.D.IIII*, small 8°.

Forty-eight pages printed in italics, with signature, but without catchwords and pagination; page 41 (sign. fii) is blank, page 40a: *Errores.* Was published in Florence by Philip Giunta December 29, 1503; is rare; cf. Ebert: No. 8191. Was reprinted in *Norimberg., apud Joh. Petreium* (1542) 4° cf. Weigel: No. 21021. It was formerly highly valued by students for the theory of proportions, but is without illustrations.

Erhart Schön Unnderweissung der proportzion vnnd stellung der possen, / liegent vnd stehent abgestolen wie man das vor augen sicht / in dem puchlein durch Erhart schon vonn Norennberg F *für die Jungenn gesellenn vnnd Jungenn zu unnt / herrichtung die zu der Kunst liebthragenn vnd / in dann truck gepracht.* 1538; below this the initials, *E. S.*, interlaced. The colophon: *Gedruckt zu Nürennberg durch / Christoff Zell beyn Rosenbad.* Small 4°.

Comprises in all 21 pages, counting the title, and contains many woodcuts printed in the text illustrating the proportions of the human body, with figures and mathematical diagrams. The book was republished in 1540, 1542, or 1543. Cf. Heller: *Geschichte der Holzschneidekunst*, page 116: Haller: *Bibl. anatom.*, I, 192.

Heinrich Lautensack: Desz Circkelsz vnd Richtscheyts, auch der Perspectina, vnd Proportion der Menschen vnd Rosse, kurtze, doch gründtliche vnderweisung, desz rechten gebrauchs. Mit viel schönen Figuren, aller anfahenden Jugendt, vnnd andern liebhabern dieser Kunst, als Goldschmiden, Malern, Bildhauwern, Steinmetzen, Schreinern, etc. eigentlich fürgebildet, vormals im Truck nie gesehen, sonder jetzunders von neuwen an tag gegeben, Durch etc. Gedruckt zu Frankfurt am Mayn bey Egenolff Emmel, Jn verlegung Simonis Schambergers. Jm Jahr, M.D.C.XVIII, colophon: *Gedruckt zu Franckfurt am Mayn, Jm Jahr 1618*, folio.

Contains 4 and 54 pages with many woodcuts printed in the text; the third part of the book dealing with the proportions begins on page 32*b* and contains many woodcuts, which, however, are smaller than Dürer's. On page 51*a* the text on the proportions of the bodies of horses begins, illustrated by three woodcuts. It has been published before at Frankfort on the Main by G. Rabe, S. Feyerabend, and H. Lautensack, in 1564, folio. Weigel: No. 8545, 19427. The author, on the title-page, calls himself a goldsmith and painter of Frankfort on the Main.

Jean Cousin: Livre de pourtraittre. Contenant par une facile instruction, plusieurs plans et figures de toutes les partiees separées du corps humain: ensemble les figures entieres tant d'homes, que femmes, et de petits enfans: Veues de front, de profil et de dos, avec les proportions, mésures et dimensions d'icelles, etc. Paris: Jean Leclerc, 1608, oblong folio.

Thirty-seven pages with woodcuts. Counting the printed parts there are in all 40 pages; the cuts are supposed to have been drawn on the block by Cousin and cut by Leclerc. Was published later under the title: *La vraye Science de la Pourtraicture. Représentant par une facile*, etc. Paris: *Guillame Le Bé*, 1656, oblong folio. Weigel: No. 19497, 19498.

Filippo Esegrenio: Li primi elementi della simmetria ossia commensurazione del disegno delli corpi umani e naturali—al giovamento delli studiosi di questa nobil arte, s.l. et a., 4°. In Latin: *Facillima methodus delineandi omnes humani corporis partes. Ex typographoeio Remondiniano Veneto*, folio, 24 beautiful copperplates; in the Italian edition the author calls himself *Pittore ed Antiquario.*

Crispino del Passo: La seconda parte della Luce dell' arte, dove s'insegna la proporzione del corpo d'uomini e donne, etc. Amsterdam, 1664, folio.—*La terza parte del designare, continente diverse posture de femine nude, tanto grasse che mediocre*, etc. Amsterdam, 1664, folio.

The first part of this work consisting in all of five parts, was published Amsterdam, 1663; the second part contains twenty-five academic figures and eleven plates on perspective; the third part contains two plates illustrating the human proportions and thirteen nude female figures.

Girard Audran: Les proportions du corps humain mésurées sur les plus belles figures de l'Antiquité. Avec 30 planches, Paris, chez Audran, 1683, folio.—*G. Audran, graveur du Roi, les proportions*, etc. *Paris, chez Chéreau, graveur, MDCCLXXXV*, fol.

Contains 30 copperplates in folio, with measurements of the proportions; the last four plates crosshatched; 4 pages of printed text.

——— *Des menschlichen Leibes Proportionen, von denen Vortrefflichsten und allerschönsten Antichen genommen, und mit Fleisz abgemessen durch Mr. Audran Professeur*, etc. *Anitzo den Kunstliebenden zum Besten, ins Deutsche übersetzet. Jn Verlegung Joh. Jac. oun Sandrart sel. hinterlassenen Erben. Nürnberg, gedruckt bey Christian Sigmvnd Froberg*, s.a., *folio.*

This German translation was probably published in 1689, with 26 folio copperplates and 4 pages of printed text. The copperplates were engraved by Sandrart himself. An earlier edition was published, perhaps without place and date, in folio. Cf. Weigel: No. 19326, 19937.

Les premiers Elémens de la Peinture pratique. Enrichis de Figures de Proportion measurées sur l'Antique, desinées et gravées par Jean Bapt. Corneille, peintre de l'Academie Royale: Paris, Nicolas Langlois, 1684. Small 8°.

Is said to be rare but useful, on account of its concision. Weigel: No. 6813.

Georg Lichtensteger: Die aus der Arithmetic und Geometrie geholten Gründe der menschlichen Proportion, Nuremberg, 1746, fol.

The author was a copper engraver and art-dealer in Nuremberg; cf. Haller: *Bibl. anat.*, II, 407.

——— *Vorstellung der Gebeine und Muskeln des menschlichen Körpers. Wobei dieselben in ihrer natürlichen Farbe dargestellet, und in Teutsch, Lateinisch und Französischer Sprache tabellenförmig beschrieben sind. Nebst Einleitung von dem, was überhaupt von den Gebeinen und Muskeln zu merken ist. Deme auch eine eigene Beschreibung der Proportion einer acht Kopf grosen Figur und der Uebereinstimmung seiner Theile, beigefüget worden. Künstlern, Wundärzten und Liebhabern zu Dienst, herausgegeben und verlegt von,* etc. *Gedruckt bey Joh. Jos. Fleischmann, Anno 1774, fol.*

Comprises 10 printed pages and 16 copperplates engraved by G. Lichtensteger; only the first plate without number pertains to the theory of proportions, all the others are myologic, and some of them colored. On Plates I and III we read: *Nic. Fried. Eisenberger ad Nat. del. et sc., Georg Lichtensteger excudit. Norimbergae.*

Teekenboek der Proportien van 't menschelijke Lighaam Geinventeerd en Geteekend door Jacob de Wit. This is engraved on the allegoric copper-title, while the printed title that follows reads: *Les proportions du corps humain. De proportien van het menschlyk ligchaam geinventeerd en geteekend door Jacob de Wit. Te Amsteldam, by W. Vermandel en J. W. Smit. MDCCXC.* Large 4°.

Contains 16 pages of Dutch and French text printed side by side. Not counting the copper-title, there are twelve plates. The copperplates are engraved by Jan Punt and represent figures showing the proportions of man, woman, and child, and especially of the head, also those of the Farnese Hercules and Apollo Belvidere. It was published before without place and date, Amsterdam 1747, large oblong folio, with 13 plates. Cf. Weigel: No. 21016.

Jan Stella: Mesure et proportion du corps humain, Paris: Daudet, s.a.; 17 plates in outline.

François Anne David: Proportion des plus belles figures de l'antiquité, accompagné de leur description par Winckelmann, Paris, 1798, 4°.

C. A. Kalliauer: Zeichenbuch; 10 pages. *Proportionen menschlicher Figuren von ihm selbst radirt.* Vienna, 1804? large folio.

D. R. Hay: The geometric beauty of the human figure defined, to which is prefixed a system of aesthetic proportion applicable to architecture and the other formative arts. Edinburgh and London: William Blackwood, 1851, royal 4°.

Contains 16 and 68 pages and 16 copperplates in folio, representing geometric constructions and illustrations of the male and female skeletons, and muscle-manikins, with the lines of proportion, after Hay's system. They are all drawn by the author and beautifully engraved by W. Forrest. Page 68 has a woodcut printed in the text, drawn by Houston from a living female model and provided with Hay's lines of proportion. Weigel: No. 18687. In French: *La beauté geometrique de la forme humaine. Avec 16 planches gravées en taille douce et une figure dans le texte.* Edinburgh, 1851, 4°.

——— *On the science of those proportions by which the Human Head and Countenance, as represented in ancient Greek art, are distinguished from those of ordinary nature.* Edinburgh, royal 4°.

Carl Gustav Carus: Die Proportionslehre der menschlichen Gestalt. Zum ersten Male morphologisch und physiologisch begründet. With 10 lithographic plates, Leipzig: F. A. Brockhaus, 1854, large folio.

Contains 4 and 23 pages and 10 folio plates drawn by Meyer and Krauz, lithographed by Hanfstängl, representing the human skeleton, the development of the ovum of the rabbit, a normal figure of the human body, from the antique, such as Silenus with the young Bacchus, Venus of Arles. Cf. *Symbolik der menschlichen Gestalt,* with 150 printed figures, Leipzig: 1853, 8°; edition 2, Leipzig, 1857, 8°, by the same author. Cf. Zeising, pages 93 *et seq.;* Weigel: No. 19321, 19918.

A. Zeising: Neue Lehre von den Proportionen des menschlichen Körpers, aus einem bisher unerkannt gebliebenen, die ganze Natur und Kunst durchdringenden morphologischen Grundgesetze entwickelt und mit einer vollständigen historischen Uebersicht der bisherigen Systeme begleitet, with 177 woodcuts printed in the text; Leipzig: Rudolph Weigel, 1845, 8°, 22 and 457 pages.

The system is based on what mathematicians call the golden mean and is chiefly used in connection with the human body, but sometimes also for other illustrations of nature and art; cf. A. Zeising: *Aesthetische Forschungen,* Frankfort on the Main, 1855, 8°.

Jos. Bonomi, sculptor: The Proportions of human figure. With six illustrative outlines. London, 1856, 8°. Weigel: No. 21015.]

APPENDICES

I. [CHINESE ANATOMY

By Ludwig Choulant[1]

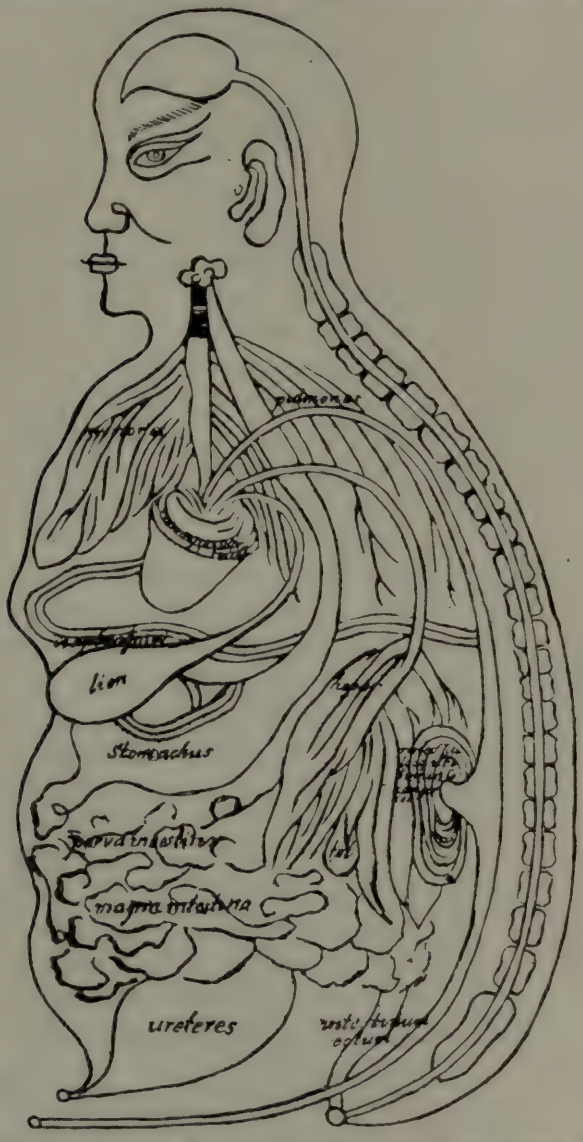
Pictures of Chinese anatomy were probably first published in Europe by Andreas Cleyer of Hesse-Cassel, a physician of the East India Company, in a work which Haller (*Biblioth. anat.*, I, 137) justly calls an *opus indigestum*. It is entitled: *Specimen medicinae Sinicae, sive opuscula medica ad mentem Sinensium, continens I. De pulsibus libros quatuor e Sinico translatos. II. Tractatus de pulsibus ab erudito Europaeo collectos. III. Fragmentum operis medici ibidem ab erudito Europaeo conscripti. IV. Excerpta literis eruditi Europaei in China. V. Schemata ad meliorem praecedentium intelligentiam. VI. De indiciis morborum ex linguae coloribus et affectionibus. Cum figuris aeneis et ligneis. Francof., sumptibus Jo. Petri Zubrodt*, 1682, 4°.

The pagination begins anew several times. Printed between the text are many smaller woodcuts representing the pulse and illustrating the appearance of the diseased tongue. Appended are thirty copperplates in quarto and among them several anatomic ones. To the latter belong the following:

Plate I. The trunk and head of a human body in profile; it shows the dissected spinal column with twenty-three vertebrae, of which the highest and lowest are longer than the rest. At the neck, somewhat lower than the mouth, partitioned into four sinuous sections or lobes, is a body representing the larynx and the pharynx, for from it descend the trachea and oesophagus. On the former, which leads to the heart, the annular cartilages are suggested at the top; the latter (oesophagus) is smooth and leads below the diaphragm into the stomach. In the thoracic cavity are shown the lungs, like soft plicate lobes, divided longitudinally into sections running from top to bottom. Cross divisions from right to left are not given. The heart is a cone with its apex pointing downward; it is surrounded externally with a covering which bears the Latin inscription *Involucrum cordis*. Into the base of the cone, pointing toward the top and somewhat to the left and back, enter the trachea and three narrower ducts, one of which leads to the left kidney

[1] *Illust. Med. Ztg.*, Munich, III(1853), 211–16.

and from there, passing beneath the urinary bladder, to the lower interior end of the abdomen; a second goes to the liver, the third to the spleen. Below the heart, the diaphragm is suggested as a double membranous



From Andreas Cleyer, *Specimen medicinae sinicae, Francofurti*, 4°, 1682

layer separating the thorax and the abdomen. Below the diaphragm, at the left and very near the front, is the spleen, shown as a vesicular body resembling the gall bladder and touching the frontal wall of the

abdomen, extending, with its blind end, even slightly beyond it. One would be inclined to take it for the gall bladder if it were not expressly marked *Lien*. Below this structure is the stomach, a sac only moderately expanded. The use of two lines for its upper curvature is probably meant to suggest a pachydermatous margin. The stomach is shown extending in its full length from back to front, so that the entrance of the oesophagus is at the back and the expansion into the intestines is toward the front. The intestines are represented as convolutions below the stomach, of which the upper layer is called *Parva intestina* and the lower layer *Magna intestina*. They terminate posteriorly in the somewhat curved rectum; the anus lies in front of the lowest vertebrae, at a distance equal to the length of the same. Behind the stomach and extending below it, but above the intestines, lies the liver, represented as a tuft with many folds as if composed of long tongue-shaped leaves with pointed apices; in its greatest length, the liver extends from top to bottom. Between this cluster of leaves and the apices of the leaves protrudes a saclike body, with an obtuse lower end, marked *Fel*. Posterior to the liver is shown the left kidney, bean-shaped and with its upper end slightly larger than the lower. The greatest length extends from top to bottom; it appears to be composed of an oblong nucleus and several coats, and is marked: *Renes seu locus ubi seminum congeries*. At the lower extremity, in front, is shown a vesicular structure, very large and terminating, toward the front, in a short narrow canal, evidently the urinary bladder, although it is marked *Ureteres*. Through all the vertebrae passes a narrow canal terminating in the anus and beginning in the upper portion of the head, with a leaf-shaped body whose apex, turned slightly downward, lies behind the forehead and represents probably the brain.

Plate VI. The lung, with the trachea entering from the top and consisting of nine rings; the highest ring and the three lower ones are somewhat longer than the rest. The lung consists of six leaf-shaped structures with pointed apices; to the trachea are attached the bases of the leaves, each one of which, like the leaf of a tree, has a midrib and veinlets branching from it.

Plate VIII. Intestinal convolutions, called *Intestinorum majorum imago*. They are the large intestines.

Plate X. The stomach with very narrow oesophagus entering from the left; at the right is the thick expansion into the intestines. The upper curve terminates in a rather straight line, while the lower one is strongly convex.

Plate XII. The spleen, at least what is entitled *Lienis imago*, is an oblong, slightly narrower at the top than at the bottom, with its sides only moderately curved.

Plate XIV. The heart. At the top the trachea enters, as an absolutely straight canal, provided with seven rings at its upper end, but smooth from thence to the bottom. From this lower part three canals branch off at the left, curved and growing somewhat thicker in their descent.

Plate XVI. The small intestine, in horizontal convolutions, lying over one another instead of being interlaced, as with the large intestine.

Plate XVIII. The urinary bladder, in its greatest length extending transversely from one side to the other, uniformly round, tapering to an obtuse end at the top and the bottom; title: *Ureterum imago.*

Plate XX. The two kidneys connected by an absolutely straight canal originating from both hila, and showing a small circle drawn in its center. The kidneys are represented fairly true to nature.

Plate XXIV. The gall bladder in the shape of a large, bulging, narrow-necked bottle.

Plate XXVI. The liver composed of seven long leaves with pointed apices and veinlets, converging at the bottom in a common stem, apparently hollow.

The remaining plates contain for the most part entire figures, among them two female figures, with designations for the many canals, which are assumed to be the conductors of primary humors and of the natural warmth, and which form the foundation of sphygmology. The lower part of the trunk is always very modestly covered with drapery so that the external genitals of either sex are never seen.

At an earlier period, the Pole, Michael Boym, a Jesuit and missionary in China and Siam, had compiled a work on Chinese medicine from native sources, in Chinese and Latin. The Latin translation was put together, it is alleged from fragments, by the above-mentioned Cleyer, who sent it to the Jesuit, Philipp Coplet. Thus originated a book with the following title: *Clavis medica ad Chinarum doctrinam de pulsibus, autore Michaelo Boymo. Huius operis ultra viginti annos iam sepulti fragmenta hinc inde dispersa collegit et in gratiam medicae Facultatis in lucem Europaeam produxit Andreas Cleyerus. A quo nunc demum mittitur totius operis exemplar, e China recens allatum et a mendis purgatum, procuratore Philippo Copletio, sine loco*, 1686, 4°, 144 pages and 6 copperplates in quarto pertaining to sphygmology, and not anatomic.

The same text with the copperplates is also contained in *Miscellanea curiosa sive Ephemeridum Academiae Naturae Curiosorum Decuria II. Annus IV. (1685) Norimb. sumpt. W. M. Endteri*, 1686, 4°. The appendix shows that the first-mentioned edition is nothing but sheets taken from the *Ephemeridae* and separately bound. The only anatomic illustration is on page 144, a small woodcut in the text representing the *pericardium* or the *involucrum cordis*, as a bag with a stem or a canal entering at its upper broad end.

The well-known surgeon Fabricius von Hilden (1560–1643) is said to have owned a Chinese manuscript with anatomic illustrations which he had received from China (Haller: *Bibl. anat.*, I, 9, 138). In the complete edition of his works, however, nothing is said about it. In *Description de l'empire de la Chine*, etc., Vol. III (La Haye, 1736, 4°), by the Jesuit, Duhalde, one may find on pp. 461 ff. a representation of Chinese medicine. Recently F. A. Lepage treated this subject in a separate work in *Récherches historiques de la médicine des Chinois*, Paris, 1813, 4°. But both descriptions are without illustrations.

Through the agency of Dr. G. Schultz, prosector at St. Petersburg, four genuine Chinese plates acquired by the Russian mission in Peking, were obtained for the library of the Medico-Chirurgical Academy, and since they are beyond any doubt originals, an exact description of the illustrations follows:

The plates, each 0.75 meter high and 0.29 meter wide, have been printed on one side of very thin tissue paper, with somewhat gray ink, apparently by means of wood blocks. For the sake of durability they were mounted on cardboard at St. Petersburg. On the figures themselves there is a great deal of Chinese writing in various sizes; a small part was translated by the well-known missionary, Gützlaff, later English commercial agent, during a brief stay at St. Petersburg and will be given below.

The first plate contains the profile view of the trunk and head of a human body, without the arms, legs, and genitals. It resembles the figure represented on the first of Cleyer's plates, except that it is reversed. On the original plate is shown the right side of the face and the body, while Cleyer's plate shows the left side. Cleyer's figure was probably put on the copperplate just as it was found on the original plate and therefore appeared reversed on the print. Other differences must probably be blamed on the artist; the original plate has only twenty-two vertebrae, of which only the highest is very long while the lowest equals the rest in size; the mouth is of regular shape and small, the oesophagus

narrower than the trachea (while with Cleyer the latter is narrower), on the trachea thirteen broad rings are indicated. The upper end of the heart into which the trachea, very much narrowed, enters is shown turned upward and slightly to the right; one of the canals arising from it leads into the right kidney and from there, following the course of the spinal column and passing beneath the urinary bladder, descends to the lower part of the abdomen; from whence it ascends to the front and widens into the lower anterior and empty part of the abdominal cavity, which lies in front of the urinary bladder. With Cleyer, it proceeds as a tube up to a ball or aperture, lying beneath and separated from the urinary bladder. The second canal, proceeding from the upper part of the heart, leads to the liver, the third into the organ which Cleyer calls the spleen, but which, judging from its position in the original plate—it lies on the right side of the abdomen and very near the front—and also judging from its shape, might be the gall bladder. The anus lies near the lower end of the last vertebra, while on Cleyer's plate it lies away from it. In the center is also shown the body which, toward the bottom, has the shape of a sac and might be taken to be the gall bladder; it bears here also two Chinese characters. Only the right kidney can be seen; the anastomosis of the duct descending in the back is not obtuse, as with Cleyer, but sharp-edged and pointed and seems to be an attachment rather than an anastomosis. The urinary bladder is a sac tapering to a point at the bottom; there is no indication of a canal as shown by Cleyer.

The second plate represents a full front view of a complete human figure and corresponds with Cleyer's second copperplate. Over the middle part of the body is thrown an apron. The whole figure shows only the canals in which the blood, the natural warmth, or the primary humors are supposed to flow, and the places for feeling the pulse. Noteworthy are two rounded, trilateral excrescences, on one side above the forehead pointing slightly outward, to which canals lead; and the sternum, which is represented very distinctly and on which the manubrium and the two parts of the metasternum can be very well distinguished. The body of the sternum itself consists of seven pieces; the ribs and intercostal spaces are shown in outline only; four false ribs are distinctly brought out. The umbilicus is indicated by a small rounded slanting shield with writing; nothing is seen of the genitals; fingers and toes have long nails.

The third plate represents a back view of a whole human figure with an apron over the loins and corresponds with Cleyer's third copperplate.

Here, also, the two lateral excrescences are shown on the top of the crown of the head, bearing the same Chinese characters as on the preceding plate; the vertebrae are represented as round bodies, of which there are twenty-four, the lowest one being very small (with Cleyer they are rectilinear structures). The scapulae are without acromial processes, the nails on the fingers are very long, those of the toes are shorter. In the region of the kidneys there are two roundish shields.

The fourth plate shows a whole human figure, with an apron over the loins. It is a view of the left side of the body. The left arm is placed on the hip, the right arm is bent at the elbow-joint and is covered with a wide sleeve so that only the upturned hand at the neck can be seen; thumb, index, and the little finger are stretched upward; the middle finger is bent over toward the upper joint of the thumb; the fourth finger is bent back into the palm of the hand. The nails are very long on both hands and short on the left foot; on the right foot they are covered by a shoe. On this plate, as on the two preceding plates, nothing anatomic is represented, only the imaginary canals and places for feeling the pulse. This plate corresponds with Cleyer's fourth copperplate, except that the latter is reversed, so that the body is seen from the right side.

This makes it certain that Cleyer had these, or very similar plates, before him and that he had them copied on a reduced scale of a little less than one-third their original size. Many things, however, especially in the represented canals, had to be omitted. Nor were any pains taken to reproduce them on the copperplate with the use of the mirror, so that they are all reversed. All the Chinese writing of the original plates is also left out.

The passage translated by Gützlaff was taken from the fourth plate, the one just described (the lateral view), and there constitutes the title:

> The heart is the monarch of the whole body. The lung is the communicating principle which rules over all the members (prime minister). The liver is, so to speak, the general for the strategic branch. The bile is the principle that always leads to equability and which causes decision and acts as the handmaid of joy and happiness. The spleen (*Pi*), a department of the stomach, is like a granary which produces the five types of taste and gives the power to feel them. The large (long?) intestines are the great viaduct in which everything is changed. The small (short?) intestines are the rich recipients which throw out the transformed substance. The kidneys are the strengthening principle whence all firmness proceeds. The urethra (*san-tsi-ao*) is a channel through which the water is conducted. The bladder is a receptacle of saps (seminal fluid?). When our temperature changes we can shed tears—but we must never shed uselessly any of these two saps (namely tears and

semen). The heart is the lake of the marrow and of all that concerns the brain, from the top down to the lowest part, and controls the kidneys, the five different intestines and the six inner organs, the hundred kinds of marrow and the nine apertures, the arteries and the veins, which are all connected with each other like joints. The bile is the lake of the central humor between the two milk receptacles which are the two principles of life, both of the male and the female, and the source of everything living. The diaphragm lies underneath the lung and the heart and extends like a curtain to the vertebrae, covering the coarser humors in order to prevent them from evaporating and ascending. All humidity enters into the bladder and the waste matter into the large intestines, from whence it is excreted through a viaduct between the large and small intestines. The red field (the heart) comprises six joints (departments), but the pulse of the kidneys has seven joints (or, the pulse of the kidney is the seventh joint). At the side of these seven joints is the upper heart and this is the door of life, etc.

So far Gützlaff, who dictated this translation rather hastily and who himself admits that he was unable to interpret many characters. Another sinologist will probably interpret many portions quite differently and will perhaps know how to account for the symbolic and allegoric terms.]

II. SCULPTURE AND PAINTING AS MODES OF ANATOMICAL ILLUSTRATION

By

Fielding H. Garrison and Edward C. Streeter

The earliest known hand-drawings in manuscript representing details of human anatomy (from the twelfth century down to the time of Leonardo da Vinci) are of the most rudimentary and diagrammatic character and, for several centuries, reveal nothing but servile adherence to tradition. Before the advent of Leonardo, the finest figurations of anatomical structure were by-products of the advancement of the plastic and graphic arts. The question, "Did anatomy do anything for art?" has been conclusively answered by the late Dr. Robert Fletcher, in two essays of unrivaled scholarship, viz., "Human Proportion in Art and Anthropometry" (1883) and "Anatomy and Art" (1895). In Fletcher's view, the concept "artistic anatomy" should be replaced by "artistic morphology," its true content being physiology and external pathology, rather than the science of musculature. Our problem is: Did art, in the sense of sculpture and painting, do anything for anatomy? What such processes as free-hand drawing and engraving did for anatomy has already been exhaustively considered by Choulant himself.

Detailed investigation of this subject is of recent date. It has two aspects: (1) anatomical illustration without (didactic) intention, (2) anatomical illustration with intention. Most artistic productions bearing upon our subject fall into the former class.

Far back in prehistoric time, early man seems to have concerned himself with delineation of the surface anatomy of the human body, particularly during the glacial periods, when increased cold confined him to the caves. Representations of man and animal in the shape of carvings and statuettes in bone and ivory, sculptures in *alto rilievo*, line engravings on stone and bone, and mural paintings in polychrome, abound in all the caves of the Old Stone Age (Paleolithic period). Sculpture preceded engraving and painting. The earliest known representations of the human figure have been found in the deposits of the Middle Aurignacian period (40000–16000 B.C.). In 1908, Szombathy discovered, deep in the loess, at Willendorf, on the left bank of the Danube, a limestone statuette of a woman, about $4\frac{1}{2}$ inches high, representing a nude female figure of

Statuette from Willendorf (Middle Aurignacian Period)

massive proportions, known as the "Venus of Willendorf."[1] The gigantic breasts and buttocks (steatopygy) of the primitive woman are thrown into strong relief, the head is bowed over the breasts, so that the face is indistinguishable, the arms, ornamented with bracelets, are folded over the breasts, but the feet are missing. The hair is arranged in a cascade of curls, like the coiffure of later Egyptian and Grecian women. The physical habitus is distinctly negroid, that of Maupertuis' "Hottentot Venus," and probably the effect, as Osborn says, of eating large quantities of fat and marrow, in the sedentary life and confinement to caves incident to this glacial period. Other sculptures of the Crô-Magnon artists, such as the ivory Venus of Brassempouy and other statuettes fashioned out of the teeth of animals from Laugerie Basse and Mas d'Azil, the female figurines in soapstone and talc (one a figuration of pregnancy) from the Grimaldi caves near Mentone,[2] the female statuettes of Sireuil and Trou Magrite, are described by Osborn as prototypes of modern cubist art. The posterior steatopygy is absent, but the gigantic breasts and haunches are blocked out in truly cubist fashion. At Laussel, M. Gaston Lalanne found four bas-reliefs of the human figure sculptured on limestone blocks. Of these the most remarkable are a nude female figure, 18 inches high, with large pendent mammae and exaggerated haunches, holding a buffalo horn in the uplifted right hand; another female figure with the cowl or capuchin headdress of Brassempouy; and a figure of a well-formed, vigorous man, minus head, feet, and hands, apparently in act to bend a bow or hurl a spear.[3] The latter, in sharp contrast with the female figure, is nowise corpulent, but suggests the straight flanks, narrow hips, and serviceable musculature of the athlete *par excellence*. Thus the passion for uncompromising realism in sculpture was already characteristic of Paleolithic man. The line engravings on schist and bone, representing horses, reindeer, bison, bears, rhinoceros, chamois, antelopes, birds, and plants, are also unmistakably lifelike, and the parietal decorations in polychrome, executed by Magdalenian man (16000 B.C.), and found on the walls of the caverns of the Dordogne and the Pyrenees, have the same startling realism. These mural paintings frequently convey all the semblance of "*le mouvement*,"

[1] For a photograph of which see Szombathy, *Kor. Bl. d. deutsch. Gesellsch. f. Anthrop.*, Brnschwg., XI (1909), 87, or Osborn, *Men of the Old Stone Age*, New York, 1916, p. 322.

[2] S. Reinach, *L'Anthropologie*, Paris, IX (1898), 26–31, 2 pl.

[3] G. Lalanne, *ibid.*, XXIII (1912), 129–49, 4 pl. Recently, P. Schiefferdecker in *Arch. f. Anthrop.*, Braunschweig, N.S., XV (1916), 214–29, gives a different interpretation of the last figure. He believes that the athletic man is not engaged in handling weapons but in protecting a woman from the aggressions of another man.

the ambition of modern artists. The fore and hind legs of galloping animals, such as those of running stags engraved on an antler from the cavern of Lorthet (Hautes Pyrénées), are exactly as we find them in our instantaneous photographs, an action unknown to all animal painters of later times.[1] The most striking of the rock paintings in red and black in the Spanish cave at Cogul (Lerida) represents a sacral dance of nine women around a phallic figure.[2] The women have pendulous breasts, narrow waists, flaring haunches, knee-high, bell-shaped skirts of recent fashionable type, and mantillas over the shoulders. The women depicted on the rock-shelter wall of the Alpera cave (Sierra Chinchilla)[3] are steatopygous, with exposed breasts, flaring hips and bell-shaped skirts, strongly suggestive of the physical habitus and national costume of the Spanish *maja* or *gitana*. The same bell-shaped skirt is again found in the remarkable post-Neolithic figurines excavated by Sir Arthur Evans in the palace at Knossos (Crete), representing the primordial Mother-Goddess and her votary. The breasts in these finely executed figures are again exposed and anatomically correct in execution. The anatomy of similar human figures on Cretan and Mycenaean seals and signets is far cruder in representation. The Babylonian mother-goddesses sculptured in *alto rilievo* (Yale Collections) are comely figurations of the nude, usually representing the act of suckling, vague in outline but of gracious charm. The Egyptian paintings are commonly executed in profile, and with sufficient clarity of outline. In the bas-relief of the temple at Sakkarah in upper Egypt (1500 B.C.), the fact that the harp-players are blind, while the singers are not, is wonderfully conveyed by a simple indication *en profil* (Holländer). Earlier Egyptian statuary, from the Sphinx to such figures as the Scribe and the basalt head in the Louvre, or the bronze lady in the Athens Museum, reveals remarkable rugged skill in representing the human face and form, dwindling into mere academic elegance in the figures of the Middle and New Empires. All these figures, of whatever period, exhibit Lange's "law of frontality," i.e., they are always represented as gazing directly and rigidly forward, usually motionless, but even in walking, static, in that they rest solidly on the soles of the feet.[4]

Perhaps the earliest anatomical models constructed were the ancient Babylonian livers in baked clay, subdivided into squares and studded

[1] See S. Reinach, *Apollo*, New York, 1907, pp. 6–7.

[2] H. Breuil and J. Cabré Aguila, *L'Anthropologie*, Paris, XX (1909), 17.

[3] H. Breuil, P. Serrano Gomez, and J. Cabré Aguila, *ibid.*, XXIII (1912), 556.

[4] S. Reinach, *Apollo*, New York, 1907, p. 20.

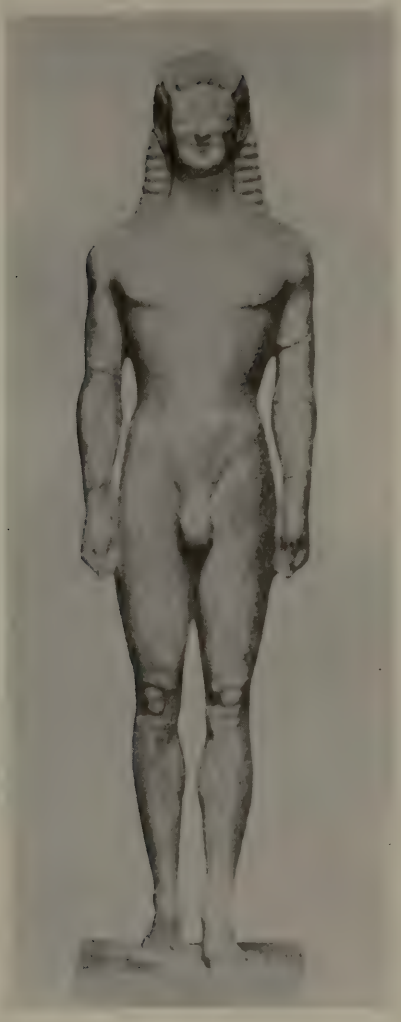
with prophetic inscriptions. Although these were used for purposes of divination (hepatoscopy), yet the nomenclature of the inscriptions and the configuration of the parts already implies considerable knowledge and study of didactic anatomy. The lobes, the gall-bladder, bile duct, hepatic duct, the *porta hepatis*, processus pyramidalis, and processus papillaris are all distinctly outlined, as Stieda has shown, and these specimens, viewed merely as examples of anatomical illustration in three dimensions, are far superior to the five-lobed livers of medieval tradition, as given in the *Tabulae anatomicae* of Vesalius. Similar models have been found on ancient Hittite sites in Asia Minor. Stieda describes an ancient Etruscan liver in bronze from Piacenza (third century B.C.) and another in alabaster from Volterra. All these models represent the sheep's liver.[1] The lore of Babylonian hepatoscopy is considerable. The figures of dancing girls, hewn out of solid rock in the temples of India, Ceylon, and the East Indies, are already splendid representations of the surface anatomy of muscular action.

The crown and flower of achievement in artistic representation of human surface-anatomy is that of Greek sculpture in the classic period, as Berenson says, "the creations of men with almost unrivaled feeling for tactile values, movement and the relation of the two." Here, in the words of Fletcher, "Art was far in advance of medicine. The noble works of Phidias and his contemporaries and successors were in existence long before the time when Hippocrates began the work of rescuing medicine from the priests and made his first imperfect sketch of anatomy." In the earlier period, sculptures in high and low relief, like those on the shields of Achilles (Homer) and Hercules (Hesiod), preceded the carving of statuary in wood and stone. Of early sculpture, such figurations as those from the temples at Selinunt (Palermo) and Gartelza (Corfu) are grinning grotesques *en face*, suggesting the fantastic carvings of Japanese art. The earliest specimens of statuary, such as the Artemis of Delos (620 B.C.) or the Hera of Samos (580 B.C.), were evolved from the crude wooden images of godhead (*ξόανα*), stiff, rigid columns, without separation of limbs or eyes, which apparently derived immediately from the aniconic idols of post-Neolithic man. Of these the Niké of Delos (Athens), the Apollo of Tenea (Corinth), and the twin figures (Cleobis of Biton) of Delphi (sixth century B.C.), while still serio-comic in facial expression, have considerable anatomic merit. As with the Egyptian statuary, these upright nude figures again illustrate the Lange "law of

[1] L. Stieda, "Ueber die ältesten bildlichen Darstellungen der Leber," *Anat. Hefte*, Wiesbaden, XV (1900), 673–720, 1 pl.

frontality," gazing directly forward, singularly alike in pose, the attitude in both being exactly that of "attention" in our "school of the soldier." In the Apollo, the pectoralis major, deltoid, biceps, and rectus abdominis muscles are thrown into relief, the musculature of the forearm, thigh, and calf of the leg is well modeled, as also the bony conformation of the wrist and ankle; the flanks, hips, and prepatellar region are unmistakably masculine in character, suggesting already a keen, accurate vision for the surface anatomy of the body. Some observation of the workings of facial musculature is evidenced in the faint smile. The hair is worn long, falling in wavy cascades of curls, as in the coiffure of Aurignacian women. The musculature of the back, the gluteal, soleus and popliteal muscles are well differentiated in the rear view, and Hyrtl's dictum that grace and poise in statuary depend, in the last analysis, upon the sculptor's exact or intuitive knowledge of underlying bony structure is already borne out in these figures. The bronze statues of Harmodius and Aristogeiton (Naples) by the Attic sculptor Antenor (510 B.C.), representing two gigantic figures in the attitude of combat, have the same anatomical merits, the muscles being thrown into sharp relief by the movement of the figures. The decorative figure-paintings on vases of this period are mainly grotesques, suggesting Persian or other Asiatic affiliations.

Greek art in the time of the Persian Wars (500–479 B.C.) was that of a period of transition. The temples erected to the gods were built of marble, instead of wood or limestone; the differential characters of sex and the external appearances of the joints and veins were better featured on the vases, and linear perspective was mastered by Cimon of Cleonae (Pliny). Sculpture, however, lagged behind, and was still in the tentative, experimental stage, feeling its way toward perfection. Molding in bronze was more highly specialized, since the reflection of the light, absorbed by translucent marble, required closer attention to surface details. The athletic bronze Apollo of Lord Strangford (British Museum) brings out the pectoral muscles, the ribs, and the masculine character of the hips and lower extremities with great clarity. The special details of bronze statuary, in which the artists of Aegina excelled, in particular the armor, weapons, and hair, were made separately and fastened to the figure. Similar details in bronze and lead were also attached to the marble figures. The finest examples of figuration in marble in this period are those which adorned the east and west gables of the Doric temple of Aphaia at Aegina, acquired by Ludwig I of Bavaria after their discovery in 1811, and restored by Thorwaldsen. Excavations made by



Apollo of Tenea (Corinth) 600 B.C.

FIGURE FROM THE APHAIAN TEMPLE AT AEGINA (FIFTH CENTURY B.C.)

Adolf Furtwängler go to show that this temple was erected after the battle of Salamis (480 B.C.), in which the Aeginetae bore away the palm for bravery. Of the thirteen figures on the western gable, ten remain; of the eleven larger statues on the eastern gable, only five. These decorations consist of a central figure (Athena) with symmetrical arrangements of warriors in combat on either side. The poses of these athletic figures afford the best opportunity for the exploitation of muscular anatomy. The kneeling Hercules, on the eastern gable, for instance, in act to discharge an arrow from a bow, reveals remarkable empirical knowledge of the effect of bending the knee and elbow-joints upon flexure and extension of the muscles of the extremities. The prostrate wounded warrior at the corner of the eastern gable, lying on his side in a semiprone posture, displays the same tendency. The figures are all nude, not that warriors actually exposed the unprotected frame to the enemy in this way, but because nudity was the "festal costume" at the athletic games from 700 B.C. on. When we reflect that Greek sculptors acquired their knowledge of the surface-anatomy of the body, the effect of rest and motion upon its musculature and its underlying bony framework, not from dissection, but from empirical observation of athletes in action during games and military exercises, the achievement seems all the more wonderful.

In the period between the Persian Wars and the age of Pericles, Athenian sculpture and architecture progressed by leaps and bounds, and the Attic drama attained its height. The temples of the gods, destroyed by the barbarians, were rebuilt in a spirit of piety and sincere gratitude. The temple of Zeus at Olympia (completed 457 B.C.) and the Siphnian and Athenian treasuries at Delphi were erected in this period. The metopes of the Olympian temple, particularly the friezes representing the twelve labors of Hercules and the battle between the Centaurs and the Lapithae, were executed with great power and distinct realism as to musculature and other details. In the compositions of the great sculptors of the period—Calamis, Myron, Phidias, Paeonios, Alcammenes, Polycletus—greater artistic freedom was attained, particularly in the expression of momentary attitudes. Calamis, Myron, and Polycletus worked in bronze as well as marble. The chryselephantine statues of Athena by the Athenian Phidias (born *circa* 500 B.C.) were celebrated in the writings of Pausanias and others, and the sculptures of the Parthenon—the metopes in *alto rilievo*, the friezes in *basso rilievo*, and many of the figures in the round of the pediments (now famed as the Elgin marbles)—were either modeled by him or executed under

his direction. Of these, the Moirae, the Theseus, the Poseidon, are splendid examples of massive modeling from the half-draped and undraped nude. The characters of his seated Zeus in the temple of Olympia are sensed in the majestic head in the Carlsberg Glypothek (Copenhagen). The Marsyas and Discobolus of Myron are remarkable for bold movement, and here the "law of frontality" is totally abolished. The Aphrodite of Myron was admired for its grace and beauty. The winged Olympian Niké by Paeonios (454 B.C.) is a splendid semidraped nude.

Polycletus, the Peloponnesian rival of Phidias, whose Amazon (Vatican) and other statues introduced the new motif of resting the weight of the body on one foot, was only excelled by Phidias in grandeur and excelled him in finish. His Doryophorus (Naples Museum) was called the "Canon," on account of its just rendering of human proportions. The wonderful power of first-hand observation of anatomical structure possessed by the sculptors of the age of Polycletus is evinced in a torso from the metopes of the friezes of the Argive Heraeum at Argos. This figure represents a nude warrior youth in violent contest with an Amazon. In the groin is a curious hernia-like protrusion, which, as Waldstein proved by dissection and by throwing a well-developed athlete into the same posture, is nothing less than the forcibly contracted pectineus muscle, not visible in repose, being hidden at the bottom of Scarpa's triangle. This muscle, which was highly developed in Greek athletes, has escaped the attention of modern sculptors, as also a well-defined line running from the groin to the ilium, which is found in all antique statues of the athletic prizemen.[1]

The pupils of Phidias, the gem engravers and the painters (Polygnotus) represent the last stages of the transition from the splendid dignity and repose (*ethos*) of the older masters, the static expression of physical power, to the newer *pathos*, which conveyed the impression of pain by muscular contraction of the body and face. The older artists avoided the expression of active emotions,

> For the gods approve
> The depth and not the tumult of the soul.

Pathos, passion, and movement were the newer ambitions of the Periclean and post-Periclean sculptors—Cephisodotus, Praxiteles, Scopus, and Lysippus, and particularly of the painters, Zeuxis, Parrhasius, and Apelles. In the beautiful draped Irene of Cephisodotus (Munich), the influence of Phidias is still apparent. The Hermes, Kore, and

[1] Sir Charles Waldstein, *The Argive Heraeum*, Boston, 1902, p. 186, pl. 30 and 34.

THE NIKÉ OF PAIONIOS (*circa* 420 B.C.)

THE DORYPHORUS OF POLYCLETUS (FIFTH CENTURY B.C.)

Cnidian Aphrodite of Praxiteles, the Apoxyomenos and Medicean Venus of Lysippus, the Milesian Venus in the Louvre have still immortal repose, suggesting physical dignity (*anima*) rather than passion and movement (*animus*). The heads of the Tegaean Temple (Athens) and Heracles (Florence) of Scopus express passion and suffering, while the Borghese warrior of Lysippus (Louvre) is thrown forward in a violent attitude of combat. The sculptures of the Alexandrian period (323–146 B.C.) were mainly character studies executed for the Roman conquerors. The Farnese Bull and the Laocoön (Vatican), both of the Rhodian School, are supreme examples of the expression of pathos and emotion by means of violent muscular movement. The Samothracian Niké in the Louvre, the Niobe in the Uffizi (Florence), and the Demeter of Cnidos (British Museum) are majestic expressions of the draped female figure. The Dying Gladiator in the Capitoline Museum and the Dying Giant (Berlin) are the best-known examples of the School of Pergamus. The sculptures of the newer Attic School, such as the Venus Genetrix and Felicitas of Arcesilaus, show greater elaboration of detail, but have little to say as modes of anatomic illustration, the actual Roman sculptures even less.

In the ancient Greek world, it was customary for those who had escaped some disaster or who were desirous of averting it to dedicate to a god an *ἀνάθημα* or votive offering in token of gratitude or anticipation of favor. These *anathemata* were usually statues or images of objects, the latter sometimes graven upon a stele. In the temples of Aesculapius, these *ex-voto* images were suspended by those who had recovered from illness or wounds, through the cures rendered by the god during the rite of incubation or temple-sleep. In the Roman civilization, the cult remained the same, and was carried over into Latinized Christianity, even through the Middle Ages. The Roman votive offering was a *donarium* or oblation, such as the clothes of the shipwrecked person in Horace, suspended on a votive tablet to the god of the sea. The *ex-voto* figurations in the medical cult represented all parts of the body—heads, eyes, ears, arms, legs, hands, feet, female breasts, male and female generative organs, viscera or a torso of the chest or of the opened abdomen with the inclosed viscera.[1] Most of these objects are rough and faulty in execution, and of little moment as examples of anatomical illustration. The best are unquestionably those representing coils of intestines. The oldest medical *ex-voto* known is a stone object from Mycenae (600 B.C.),

[1] See E. Holländer's *Plastik und Medizin*, Stuttgart, 1912, pp. 175–235, and Sudhoff, *Beilage z. Allg. Zschr.*, Augsberg, 1901, No. 140; *Zschr. f. Balaeol.*, V (Berlin, 1912–13), 461–67.

in the Schliemann Collection at Athens, representing a coil of intestines, with a smooth base, provided with bored holes for suspension.[1] There are signs of strangulation, but the mesenteric or omental attachments are not represented. This three-dimensional figuration is superior, in sheer realism, to the pictures of the same objects in the *Fabrica* of Vesalius (1543). Many of these *ex-voto* objects have been found in the Asclepieion at Athens. In the Hieron at Epidaurus, a marble votive tablet representing the ears of the Gaul Cutius, was discovered. Votive eyes and breasts are most common among the temple objects. Hovorka describes two inscribed Lydian stelae of 236 A.D., representing eyes, legs, and breasts.[2] Girard notes 110 votive eyes from the Asclepieion at Athens. The Berlin Museum possesses ex-votos of Pentelican marble from the Acropolis at Athens representing eyes, a breast with nipple, and a torso of the female pelvis, also a pair of breasts from Paros. A highly decorated Greek vessel in clay, in the Villa di Papa Giulio at Rome, has the form of the human astragalus.[3]

The cult of medical votive offerings existed also in ancient Etruria, and the most important objects excavated are from the Etruscan cities notably Veii. Others come from Capua, Nemi, Città Lavinia, Terracina, the Isola San Bartolommeo in the Tiber, and the temple of Minerva Medica in Rome. The city of Veii, the ancient enemy of Rome, was destroyed by Marcus Furius Camillus in 396 B.C. The cult of Aesculapius was introduced into Rome in 291 B.C. These dates fix the approximate period of the early Italian ex-votos in baked reddish-brown terra cotta, sometimes painted red. These donaria, first described by Ludwig Stieda (1901)[4] and Gustav Alexander (1905),[5] represent all parts of the body. The most significant for our purpose are those representing the exposed viscera of the thorax, abdomen, and female pelvis, coils of intestines and other isolated organs and viscera. It is known that post-mortem sections and dissections of the human body were never made by the ancients, for theological reasons. The exposed *situs viscerum* in these votive objects represents such knowledge as was gained from the Haruspicina, or inspection of the viscera of domestic animals at the time of sacrificial slaughter. The representations are therefore

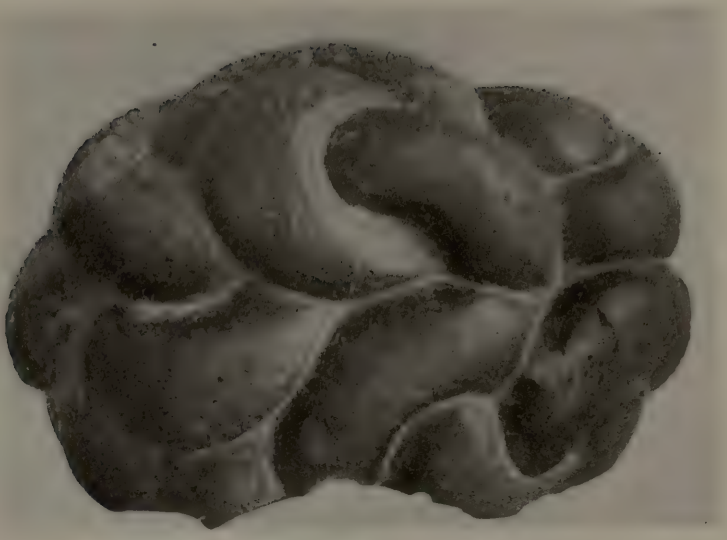
[1] Holländer, *op. cit.*, pp. 211–12.

[2] O. von Hovorka, *Wien. med. Wochenschr.*, LXIII (1913), 958.

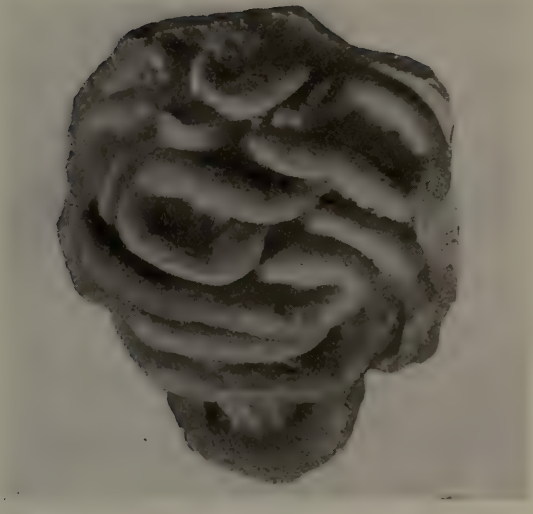
[3] Holländer, *op. cit.*, p. 189.

[4] L. Stieda, "Anatomisches über alt-italische Weihgeschenke (*donaria*)," *Anat. Hefte*, Wiesbaden, XVI (1901), 1–83, 4 pl.

[5] G. Alexander, "Zur Kenntnis der etruskischen Weihgeschenke," *Anat. Hefte*, XXX (1905–6), 155–98, 4 pl.



Coil of Intestines (*Ex voto* from Mycenae)



Ex voto from Museo delle Terme

rudimentary and sometimes inaccurate. The trachea is a definitely segmented tube, the lobes of the lungs were known, also the position of the heart between them; the stomach and coiled intestines were frequently well represented; the existence of the spleen, kidneys, bladder, uterus, vagina, and external genitalia is clearly indicated, but the liver is represented as three-lobed and no trace of the oesophagus is found. The intestines are frequently delineated as a mere wriggling line in two dimensions, like the trail of a serpent, but of the so-called *budelle*, or coiled intestines in three dimensions, admirable specimens exist in the Museo nazionale and the Museo dei Fermi at Rome. These are comparable with the isolated intestinal coils in Vesalius (*Fabrica*, 1543, 361; 1555, 562).

Apart from the medical donaria, there are a number of ancient marble sculptures which, from their nature, we may assume to have been employed for medical instruction. That such specimens of anatomic illustration may have been conceived and executed with didactic intention may be inferred from a note in Pausanias concerning the bronze skeleton at Delphi, dedicated to Apollo by Hippocrates. Such skeletons were more often as not, larvae, i.e., images of dried skin and bone with the bones thrown into relief, as in the medieval Dances of Death; but the miniature skeletons in bronze from Imola, described by Lovatelli (1895), are so exact in execution that there can be little doubt as to their probable usefulness in teaching anatomy. The marble skull in the British Museum (London), said to have come from the grotto of Tiberius at Capri, is thought by Treu[1] to belong to a late period. The most remarkable of these sculptures with presumable didactic intention, is an unusually well-executed marble torso in the Vatican, representing the thorax, with clavicle, sternum and the twelve ribs.[2] Nothing is known concerning the provenance of this fine torso, beyond the statement of Visconti (to Charcot) that it was found, along with various inscriptions relating to medical slaves, in an evil quarter of Rome, near the Via Aestensis.[3] The scientific accuracy of representation suggests didactic import. Helbig regards it as a donarium. Braun and Alexander believe that it was fashioned after an anatomical preparation, in Charcot's phrase, "*une sorte d'anatomie plastique à l'usage des médecins.*"

[1] Treu, *De ossium humanorum larvarumque apud antiquos imaginibus*, Berlin, 1874, cited by Alexander.

[2] Holländer, *op. cit.*, p. 187. Charcot and Dechambre, *Gaz. hebd. de méd.*, Paris, IV (1857), 513–18.

[3] Charcot, *op. cit.*, p. 515.

Stieda regards it as an ornament of a tomb.[1] Visconti attributed it to the age of Augustus, but it may belong to a very late period, since similar figurations of the chest are still used as votive offerings in Tyrol and Southern Germany. Another marble torso in the Vatican, first described by Charcot and Dechambre,[2] was excavated on the site of a villa which is said to have been the residence of the physician Antonius Musa. It represents the exposed thoracic and abdominal viscera. The heart lies vertically in the central plane of the thorax, as in Galen's description, and is therefore the heart of the lower apes. The left lung has two lobes, the right three, as in various apes, and representation of the stomach and intestines is faulty. As the anatomy of this "*splanchnologie en marbre*" is inferior to the anatomy of Galen, Charcot attributes it to an earlier period. Veit[3] describes an Etruscan *ex-voto* from Veii, a female torso in baked clay, acquired from the effects of Count Vespignani, the director of the papal excavations made at Veii under Pius IX. A spindle-shaped opening in the abdomen contains the exposed thoracic and abdominal viscera, the heart, lungs, three-lobed liver, stomach, intestines, and bladder, in succession downward, with spleen and kidneys on the side. This, Stieda states, is more complete than any other Etruscan *situs viscerum*. From the character of the coiffure of wavy hair, reaching to the shoulders, which was the fashion in the time of Julia Domna, wife of the emperor Septimius Severus (193–211 A.D.), this *ex-voto* has been attributed by the archaeologist Bulle to the period of Galen (131–200 A.D.).[4] Gustav Klein points out that this visceral representation corresponds closely with some of the bloodletting manikins of the Middle Ages and with the pictures in Mundinus.[5] It is, therefore, within the range of possibility that these visceral representations in marble and baked clay may have been ultimately transferred to paper to become the originals of the earliest known anatomic illustrations in two dimensions, as seen in the hand-drawings of the Middle Ages.

In this connection, an interesting question arises, namely, as to the provenance of the figurations of skeletal and visceral anatomy in the medieval Books of Hours.

In ancient Egypt and in the later Roman period, small skeletons in wood or metal were used as Epicurean *memento mori* devices at feasts,

[1] G. Alexander, *op. cit.*, pp. 191–92.

[2] Charcot and Dechambre, *op. cit.*, pp. 515–18. Alexander, *op. cit.*, pp. 191–93.

[3] J. Veit, "Ueber ein Weihgeschenk aus Veji," *Sitzungsb. d. phys. med. Soz. zu Erlangen*, XXXVI ([1904] 1905), 43–46.

[4] Veit, *op. cit.*, pp. 44–46.

[5] Veit, *op. cit.*, p. 44.

reminders of the brevity of human life. Those engraved on the silver wine cups of the Boscoreale treasure in the Louvre (first century A.D.), some of them representing the "shades" of departed philosophers, are unusually realistic in execution. But as Lessing (1769)[1] and latterly Parkes Weber[2] have shown, the skeleton was never used by the ancients to represent death itself; these serio-comic figures were merely employed at banquets with the usual *carpe diem* intention. Among the ancient Greeks, Death was figured as Thanatos, a winged black-robed figure with a drawn sword, or associated with Hermes Psychopompos, the conductor of souls to Hades, with Hermes Psychostates, the weigher of souls, or with the winged sirens on vases and sarcophagi. On various clay oil flasks (*lecythi*) in the British Museum and elsewhere, Sleep (Hypnos) and Death (Thanatos) are represented as bearing away the body of Sarpedon to Lycia (*Iliad* xvi. 671–83).[3] Dancing and tipsy skeletons abound even on vases and wine cups of the Mycenaean period; all have an unquestionable Epicurean significance. In the *Ars Moriendi* or the Holbein "Dance of Death," similar skin and bone devices occur (the *Hautskelett* of the Germans), but these now signify Death as the medieval King of Terrors. In the same period appeared the *Horae Canonicae* or *Books of Hours*, which are illustrated not only with spectral skin-and-bone skeletons of the Holbein type, but also with corpses showing the dissected viscera. Now, even as the fearsome Holbein skeletons have no possible kinship with the amiable serio-comic skeletons of the Graeco-Roman period, so it is fair to assume that the eviscerated figures in the Books of Hours had some other provenance than the marble and terra-cotta donaria of that period. With anywhere from ten to seventeen centuries intervening, the gap in time seems too great for any bridge of tradition. The inevitable conclusion is, then, that the dissected figures in the Books of Hours were derived from contemporary anatomical drawings in manuscript.[4] The following reasons may be given for this inference. In the first place, artists and physicians who followed dissection became associated through the fact that (in Florence at least), the painters formed a subsection of the Guild of Physicians and

[1] Lessing, *Wie die Alten den Tod gebildet: eine Untersuchung*, Berlin, 1769.

[2] F. Parkes Weber, *Aspects of Death and Correlated Aspects of Life* (etc.), 3d ed., New York, 1918, pp. 27–40.

[3] For which, see F. Studniczka: *Die griechische Kunst an Kriegergräbern*, Leipzig, 1915, Plate VIII.

[4] W. M. de Voynich and F. H. Garrison, *Ann. Med. History*, New York, I (1917–18), 225–30.

Apothecaries (Streeter),[1] whence it is reasonable to assume that the miniature painters of the Books of Hours were also acquainted with dissecting and dissectors. Again, the traditional dissected figures of the Books of Hours are remarkably like those in the anatomical MSS and the earliest printed and illustrated books on anatomy, the so-called graphic incunabula, and, in both, the eviscerated corpses and the skeletal larvae alike have sometimes between their outstretched legs, quaint little jesters, with caps and bells. The inference is plain.

The thirteenth century was the age of cathedrals, stained glass windows, illuminated manuscripts and missals, and beautiful carving in stone. The work of the Romanesque architects and sculptors, deriving, as it did, from Roman, Byzantine, and Arabic traditions, was composite and decorative, but otherwise stiff, conventional, and unreal. The flowering of Gothic art in the thirteenth century was as spontaneous and natural as that of ancient Greece. This art was essentially realistic, in that it sought a direct reproduction of nature, as in the carved flowers and foliage of Reims Cathedral, the carved figures of angels, saints, prophets, Christ, and the Virgin which adorned the cathedrals, the *gisants* or recumbent male and female figures on the tombs of the nobility, or the painted and gilded statuettes and bas-reliefs in wood and ivory. These figures of the Gothic *imagiers*, such as the Amiens Christ (*le beau Dieu d'Amiens*) or the Prophet of Reims, are all serene and beautiful. The pose is gracious and dignified, the skill in representing the contours of the human body underneath thin drapery is wonderful, the grotesques of Romanesque art crop out only in the gargoyles of Gothic cathedrals; but the prejudices of the age forbade alike the figuration of the nude and the study of anatomy by dissection. The science of the *imagiers* was therefore a science of draped figures. This Gothic naturalism exerted a powerful influence upon Italy, in the Apulian school of sculptors and the Florentine school of painters. The pulpit of the baptistery at Pisa, carved by Niccolò Pisano in 1260, reveals the same wonderful skill in the representation of complex drapery, and introduces a new motif, the partly draped Christ upon the cross. Cimabue, the teacher of Giotto, worked in mosaic, after the Byzantine fashion. Giotto followed Niccolò Pisano and the Gothic glass-painters of France, whose brilliant coloring is easily sensed in the paintings of the earlier Italians. As Berenson points out, Giotto was the first great artist to realize the third dimension (depth and solidity) in painting, by giving tactile values to retinal sensations. Just as the infant acquires its knowledge of depth and solidity

[1] E. C. Streeter, *Bull. Johns Hopkins Hosp.*, Baltimore, XXVII (1916), 113–18.

by the sense of touch, so these early Florentines strove to get out of the two-dimensional flatland of the Byzantine mosaics into that great field of figure painting in which the semblance of reality and movement is conveyed by "functional lines," i.e., purposeful lines which are "life-communicating, life-confirming and life-enhancing" (Berenson). Tactile values, that is, the reverse of inexpressive "dead lines" and "dead surfaces," were to be translated into movement, and this realism was attained, in the end, by deliberate science, in particular mathematical and anatomical science. Gradually the Florentines underwent a drill in such disciplines as the chemistry of colors, the mathematics of composition, the geometry of perspective, the illusions of chiaroscuro, the mechanics of motion, and the science of human anatomy. The principles of human proportion were closely studied by them. Practically all the early technical treatises on the science of perspective and the science of bodily proportion, except Dürer's, issued from Florence (Streeter).

In Giotto are found the seeds of these several developments, among other things, the Florentine *flair* for anatomy—a vast abortive inquiry into the physical make-up of man. Once aroused, this interest was never to lapse or fall from the circle of living art, although it was seriously hindered and crossed at various times by the church, as, for example, by Savonarola and again in the period of the Catholic Reaction. It should be noted that it was not Giotto's higher gifts that brought so many into communion with his artistic aims, but his compelling naturalism, his projection of reality into pictorial illusion. Gently with Giotto came the impulse to measure, to explore, to exploit the form, to the end of making more true to nature, more "express and admirable" the pictured world of life in movement. In close and incessant study of human kind, artists searched out all the experiential modes of expressing the inmost soul by the outward gesture, for this was their *métier*. And although the Trecentisti turned away the challenge of fact with rather soft answers, there abode in them at all times, Giotto's love of verisimilitude.

Reorganization of the study of nature, then, was the issue of Giotto's teaching. The spirit of inquiry into nature incited human nature in its deepest essence to push on to the discovery of man. Artists felt that incitement, in a special sense, for the human form was their supreme decorative principle, in the shaping of which they would convey reality and utter fidelity to fact. It dawned upon the minor masters following Giotto, that Nature was the specific for Art's malady, that "things of the mind which have not passed through the senses, are vain things and injurious." But this they knew only in part. They lightly accepted

nature-study as inevitable, avoiding the duteous observances. The outcome of Giottesque schooling, however, was the final abandonment of "intuitional" drawing, the refinement of plastic modeling by shading and defining the separate surface planes and a firmer accentuation of the supporting skeletal system, in each carefully observed figure. Giotto's intimate assistant Stefano (1301?–50), called the "ape of nature," attained to such a pitch of realism in representing the branching veins of the arms, that his pictures were studied by the barber-surgeons about to do bloodletting. Buffalmacco, Daddi, Giottino (son of the "ape of nature"), Orcagna, Giovanni da Milano, Antonio Veneziano, and Ambrogio di Baldese mark distinct stages in the movement toward Renaissance naturalistic forms. Still greater gains in the struggle for the mastery of form are recorded in the sculpture of this early period. Naturalistic treatment of the vital plastic problem, the cause hotly supported by Cennini in theory, and in practice by a majority of the Florentine workers in the serious figurative arts, found ready acceptance in Umbria, Lombardy, the Marches, even inhospitable Siena.[1]

A conscious search for form thenceforth characterized art on the Arno. The study of the human figure, objectified and separated from the dross of dogmatic mysteries, held most weighty claims upon artistic genius. Even as envisaged by artists of the trecentist tradition, this study partook somewhat of that intensive quality and independent trend which is the peculiar, yet typical, issue of the union of devouring eye and portraying hand. Now in Italy, eye and hand were rigorously trained for the perfect and final apprehension of form and action, three quarters of a century before the appearance of any printed work on descriptive anatomy or the mechanics of motion which could be of slightest use to an artist. In the interval, the artists, impatient to master external myology, the skeleton, the joints, even "the risings of the nerves," did pioneer work by immediate independent preparations and dissections. These artful prosectors performed so well in the field of external myology, and went so deeply into studies of function of the skeleto-muscular system, that they aroused the ire of the professional anatomists. The fact that artists were herein forestalling the school anatomists, appears on a superficial view, to upset the Pausanian theory of art which literally traces animation, proportion, and detail in painting and sculpture to the progress of geometry, mechanics, arithmetic, and anatomy.

[1] See Giovanni di Paolo's (1403?–82) "John the Baptist," Paul Sachs Coll., Cambridge, Mass. Vechietta's (1412–) "Cristo resorto" bronze, Kann Coll., Paris; and his paintings in the hospital at Siena. See also frescoes of Domenico di Bartolo and the work of Vechietta's follower, Francesco di Giorgio.

In Florence, the circle of true instruction ran on to Antonio Veneziano, who taught Starnina, who in turn taught Masolino. Thus the last of the Giotteschi touched hands with the first Quattrocentisti. Art straightway became more curious and attentive to form, more accommodative and explicit in expression. The unclouded drawing of the nude figure in Masolino's "Baptism of Christ," in the baptistery at Castiglione d'Olona, and Masaccio's epochal frescoes in the Carmine at Florence signalize the return to the Greek conception of form and, at the same time, a return to nature. Leonardo once remarked that Florentine art entered a decline after Giotto, "until Masaccio showed by his perfect works how those who take for their standard anyone but nature—the mistress of all masters—weary themselves in vain." Of Masaccio's frescoes in the Brancacci Chapel, Berenson says: "I never see them without the strongest stimulation of my tactile consciousness. I feel that I could touch every figure, that it would yield a definite resistance to my touch, that I should have to expend thus much effort to displace it, that I could walk around it." With such an ambition as this, with the keen desire to realize depth in space, to convey the illusion of mass underneath the external configuration of the body, with the passion to express the muscular basis of bodily action by surface indications, the Florentines took up dissection, as also the mathematics of perspective and proportion, as a necessary part of their training.

It should be noted here that the painters had early been incorporated in the great "Guild of Physicians and Apothecaries."[1] "Being beholden for their supplies of pigments to the apothecaries and their agents in foreign lands" on their own petition they had become enrolled members of that guild in 1303. This guild relationship endured for more than two and a half centuries, furnishing innumerable points of magnetic contact between Science and Art. The artist members (known from 1349 on, as "The Company of Saint Luke") stood on a most familiar footing with the apothecaries "who buy, sell, and deal in colors and other materials needed by artists" (*spetiarii, qui emunt, vendunt et operant colores et alia ad membrum pictorum memoratum*). Many a "discipulus" from the apothecary shops rose from color-grinding to eminence in the schools of painting. Masolino was not the first of these, nor Cosimo Roselli the last. These dusty backshop prentices who ground colors for the master apothecaries were in daily contact with the medical partners of the shop (*medicos in apotheca*) whose consulting rooms adjoined.

[1] La Sorsa, *L'Arte dei Medici, Speziali e Merciai.* Molfetta, 1907. E. Staley, *Guilds of Florence.* London: Methuen.

The artists, too, who came there perforce for pigments and other materials, found the shops alluring places in which to loiter and renew acquaintance with their fellow-guildsmen, the apothecaries and physicians. Thus through close guild and trade relationships easy intimacies arose between men of the two callings. The physicians were not only the sponsors for the artists in the guild's multiform functions, but their natural patrons, protectors, and collaborators. Hence, when the tide of realism in art rolled over north Italy, adherents of the two branches of the house of St. Luke (painter and beloved physician) could have collaborated, with brilliant effect upon Tuscan art and science. On the whole there was but little concerted action of this kind, and we are put to some trouble to explain the situation on the ground of any fundamental lack of accord. The earlier anatomizing artists, urged on by the grim requirements of formal technique, expected little, and derived little support from physicians in working out their peculiar applications of anatomy to problems of form. Artists concentrated their interests upon the skeletal and muscular systems. Professional school anatomists before Vesalius had failed to elaborate these systems in any detail whatsoever. Even Berengar confesses scant interest in matters of external myology, because of the difficulties in the way of prosection:

> Note, reader,[1] that I have made very little comment on the muscles of the body, and that I have concerned myself very sparingly with this system; mainly for the reason that, in the ordinary dissections made before the scholars in the schools, the majority of the muscles cannot be demonstrated. To expose these structures to view properly, extremely long and painstaking labor is required, as well as a suitably appointed room (*ita locus accommodatus*, a place arranged just so).

And yet the smallest mortuary chamber, cubicle, or side chapel in the charnel house sufficed the artist—a cellar or burial pit—it mattered not, when he went down to make essay of the "science of the sepulchre."

A large share in matters of scientific moment was taken by Paolo Ucello (1397–1475), whose zeal for the house of science had all but eaten him up. He typifies the adventurous temperament of the time. He lacked the largeness of intelligence, the godlike comprehension, the vast variety of attainments of men of the universal stamp like Brunelleschi, Ghiberti, Donatello, Orcagna, Luca della Robbia, and Leon Baptista Alberti. His talent was expended in design, in genre, in geometric development of the laws governing perspective and foreshortening. His passion for literal delineation of the near and present and inquisitive attitude toward exact science, he passed on to scores of unknown industrial craftsmen in Florence, whose unremembered labors enabled later

[1] *Carpi Commentaria . . . . super Anatomia Mundini*, Bologna, 1521, p. 516.

painters to proceed from a basis of exact science to the far nobler pursuit of ideal beauty. Men of Ucello's following hewed close to the line; the Carrand Master, the artist of the "Ten Nude Men" in the Stockholm Collection, the creators of those unattributed gems of naturalistic representation now gathered in the Uffizi, the Louvre, London, Berlin, Vienna, Venice, Dresden, and in private hands, flooded the "botega" of Ucello's day, with a tide, full and flowing, of chalk and wash drawings, pen and silverpoint. These studio sketches and cartoons reveal, to the least prickings of the paper, the full reach of Florentine technique in drawing the living model. They register most patently the crescent interest in anatomy.

Despite earlier hints of the existence of this "*corporum intus curiositas*" among workers in the plastic arts, the followers of Donatello were apparently the first to undertake the study of human anatomy, in the modern sense of a sustained serious discipline for artists. That Donatello (1386–1466) himself assisted at an actual anatomy, at least from the spectator's bench, we need no better proof than his forceful rendering of such a scene in his "Anatomy of the Miser's Heart," one of his Paduan[1] series of bronze tablets illustrating the miracles of St. Anthony. The almost cruel naturalism and searching myologic detail in Donatello's sainted peasants proved a source of torment to lesser craftsmen, leading them along paths of purely objective inquiry to the dissecting room. His pupil Antonio Pollajuolo (1429–98), pupil also of Ucello, was the virtual beginner of artistic anatomy in Italy. "He dissected many bodies to study the anatomy," says Vasari, "and was the first to investigate the actions of the muscles in this manner, that he might afterwards give them their due place and effect in his works." His drawings created a clear space for the new teaching. His engraving of the "Battle of the Ten Nude Men" electrified the town. His painted themes, in which Hercules generally takes the leading rôle, are anatomies of stressed movements, bizarre energy, unimaginably fierce and vengeful power. And the sources of all this sinewy, exuberant phrasing of life spring from immediate and prolonged manipulations of the dead. Pollajuolo had established altogether novel modes of approach to the intimacies of form, and could say with Browning: "The life in me abolished the death in things." This quickening impulse soon made itself felt in all the schools, pagan and pietistic, realistic and conventional, and crossed the Alps northward with Dürer on his return home.

Andrea del Castagno (1396?–1457) "lover of the difficulties of art" (*ammatore delle difficultà dell' arte*) certainly helped to incorporate the

[1] W. Bode, *Donatello in Padua*, Paris & Leipzig, 1883, Plates X and XI. See also St. Anthony setting a broken leg in the same series.

teaching of Masaccio in respect of figure-draughtsmanship, and may have anatomized to attain that incisive point and apposite modeling which is so striking a characteristic in his work. Although he did not matriculate in the Guild of Physicians and Apothecaries until he was fifty-five, he became a lusty exponent of the new plastic conceptions furnished by proportional analysis and dissection. He is a strict uncompromising realist, bound to his model, in all narrowness, believing that to embellish is to falsify. His interest in character, in ethnic type, is intense. Postmortems by him would surely be expressed in terms of some new declension for he engaged new appetencies for the task, viewing the thing thus from the ethnic angle.

Ucello, Castagno, Baldovinetti, whose great pupil was Verrochio together with Piero della Francesca, whose great pupil was Signorelli, brought in flowing wells of refreshment to Umbro-Florentine art, to join the racing tumult of waters set free by Pollajuolo, or to spread abroad in other directions. The Medici made a special point of encouraging Tuscan artists with scientific leanings. Thus, to impart a fillip to Verrochio's more academic interest in human anatomy, was he commissioned to restore an antique statue of the flayed Marsyas which glorified the gate of the Medici gardens—given the mutilated red-marble torso, by sheer "tour de force" to reconstruct the missing parts. The which he did with consummate skill, utilizing the white veins of stone as the proper superficial veins of the limbs. Verrochio (1435–88) was the first to make practical use of casts of the living body and *écorché* posture models, for use in schools. These marvelous flayed figurines, exhibiting all the superficial muscles in action, accurately moulded in wax, terra-cotta, plaster, carved from marble or cast in bronze, formed a fresh series of essays in artistic anatomy. Verrochio's bronze *écorchés* certainly were calculated to excite the admiration, emulation, and despair of his contemporaries, the same contemporaries who criticized the naturalism of the horse in his great Colleoni statue for its literal translation of the anatomy of the animal as seen dissected. In this sculptor, bronze worker, goldsmith, builder, and painter, the "true-eye," expressed in his very name, meant analytical vision, the firm, poised, robust character of a born teacher. Small wonder that Leonardo lingered on in apprenticeship to this man, for years after his admission to the guild, imbibing sound method of science along with ideals of drawing, of modeling, of formal composition in line and plane.[1]

[1] See *Leonardo da Vinci*, Oswald Sirén, Yale University Press, 1916, chap. iii, "An Apprentice in Verrocchio's Studio."

The progress of naturalism was continuous and triumphant; under such champions of reality it was destined to spread far and wide over Italy and finally over Western Europe, in the swift seasons of the diaspora of Florentine science. The new art, grounded on actuality, pleased the princes, and, at the same time, commended itself to the honest and honorable intelligence of the bourgeoisie. In Italy, the people, in wider commonality, had come to share the artist's passion for unadorned truth. There, the verities reigned, through popular choice. "The desire of seeming wise on matters of form, with which every man of us is born" was there recognized as the last treachery of the artistic hand and soul.

The old *Ars et Mysterium* in the canons of painting no longer obtained—at least, there was no longer the mysterious content in the teaching. "Beauty is measured and proportioned by geometrical accuracy." This rule, repeated on all hands, doubtless led to trials of "presumptuous and paltry technical skill" (Ruskin's wrathful characterization of this trend), yet it led straight on to the creation of immortal works, symbols of the highest connotation, most profound experiential expression, attained by man in his glad runs through the amazing universe.

Among those who ran the whole gamut of experience, endowed with the universal mind, mark Piero della Francesca, who became a great master in the exact sciences before he became one in the arts. "He understood all the most important properties of rectilinear bodies better than any other geometrician" (Vasari). He wrote a treatise on perspective, for centuries accredited to a mythical Peter of Bruges. He trained in "*proportioni et proportionalità*," the great Pacioli, companion in studies mathematical of Leonardo da Vinci. His studies of the undraped figure are splendidly realized, effective, and living portraits of the body. His frescoes at Arezzo set him apart as one of the foremost masters of figure expression. His treatment of the resurrection theme at Borgo San Sepolcro proved for all time that "Nature could not invest herself in such shadowing passion of line without some instruction" (to adapt Iago's vivid phrase). On the whole, considering Piero's extant works and his known preoccupation with matters of pure science, the presumption of fact is that he anatomized. He was, in spirit, more scientific, and in his art, more narrowed and bound to nature, than any of the great Florentines with the exception of Leonardo. His Umbrian follower and spiritual heir, Luca Signorelli (1441–1523) exploited the nude in art with astonishing verve and abandon. Luca's severe and sculptural design and modeling, as seen in his "Education of Pan" (*circa* 1475) now

in Berlin, changed, in the following thirty years, by some subtle increase in vehemence of execution, into an utterly different thing, or at least a modally different thing. His frescoes in the cathedral at Orvieto whirl the beholder into regions of Dantesque impressiveness and solemnity. These awful walls are charged with great, primal perfervid presences, executed on a heroic plane; the elder brothers of Michelangelo's Sistine conceptions. Signorelli was a restless experimenter; his handling of vital plastic problems, without diminution of the sense for pictorial illusion, is instinct with a vigor and intensity which is almost satiric, sardonic. Luca even nerved himself to paint the body of his own dead son. That he painted for painters is readily seen.

Of Melozzo da Forli (1438–94), another pupil of Piero della Francesca, although much could be said, we will mention only his "Pesta-Pepe" or apothecary's assistant braying in a mortar with the muscles of a Hercules—a panel which originally must have served as a druggist's shop-sign. It is done in a vein too dashing to allow of comparison with that piece of neat quick fashioning of the outward form by his master Piero—the "Ercole" from Borgo San Sepolcro, now in Mrs. Gardner's collection—yet the derivation is plain.

Other Umbrians, as Fiorenzo di Lorenzo together with his pupils Perugino and Pintorricchio, never quite succumbed to the spirit of Florentine science, although admitting its prepotency. They drew their St. Sebastians with anatomic refinements which were borrowed, rather than the outcome of individual research. Raphael, too, misprized science while in Urbino and under the influence of these men, yet it is well to remember that his first teacher Timoteo Viti, who had quitted the Bolognese studio of Francia in 1495, in that studio had seen much of the great anatomist Achillini, the life-long friend of Francia. Raphael had a genius for assimilation and in his Florentine period (1504–8) imitated Leonardo and Michelangelo, drinking deep of the Pierian spring. There is much to give color to the rumor current at his death and credited throughout the two centuries following, that Raphael had imitated Leonardo and Michelangelo even to the point of preparing materials for a work on artistic anatomy.

Padua possessed much work of unique merit from the hands of early Florentine masters, and was susceptible to their moulding influence. Giotto (1306), under the eye of exiled Dante, raised the standards of universal beauty in the frescoes of the Arena Chapel; Donatello labored at Padua from 1443 to 1453; Ucello was there also at some time in the same decade, and Fra Filippo Lippi worked there in 1434. Squarcione,

head of the native school in which ancient Roman sculpture and the new Florentine models received equal attention, consciously adhered to the naturalistic mode. He and his scholars lived on terms of some intimacy with the physician Michele Savonarola, in whose brother's house the school was maintained. Squarcione's school took on a tremendous significance through the genius of his chief pupil and adopted son, Andrea Mantegna (1431–1506), the most influential artist in North Italy during the early Renaissance. Mantegna's earnest and intense search for reality is seen in the figures of the Eremitani frescoes. His study of the "Dead Christ" in the Brera Gallery is accepted as the extreme and sovereign instance of realism, the direct inspiration of Tintoretto when he painted his "Finding the Body of St. Mark" (likewise in the Palazzo di Brera) and of Rembrandt's "Deyman Anatomie," in the Rijksmuseum. Next to Mantegna, Cosimo Tura (1430?–95), founder of the school of Ferrara, and Vincenzo Foppa, central master of the Lombard and Brescian region, strove to disseminate most widely the fruits of Paduan discipline.

In studying the early art of Venice, with the view of determining anatomical content and direction, one pauses over Vivarini's long-proportioned figures with exaggerated articulations, and Carlo Crivelli's (1440?–after 1493) scientific interest in tendons and muscular attachments. There is excellent matter in the London and Louvre sketch-books of Jacopo Bellini, and in the work of his sons and their incomparable school-following; in Giorgione (1478–1519) and Titian (1477–1576) whose perennial devotion to the nude was expressed in many a gorgeous Venus, Danae, Europa, Antiope. When Rubens was executing his Prado copy of the "Rape of Europa" he wrote that this Titian to him stood forth as the first picture in the world. To Titian's mind, the St. Sebastian panel of the five-winged altarpiece for the Bishop of Pola, was pre-eminently the best delineation of the figure of which he was capable. The Rhenish follower of Titian, Jan van Calcar from the duchy of Cleves, illustrated the "Fabrica" of Vesalius, fifty-two years after the first anatomical book illustrations for Ketham's "Fasciculus" had been prepared by Mansueti(?), or some member of the school of Gentile Bellini.

The versions of Venus by the mountaineer Palma Vecchio are rugged and healthy (Dresden and Cambridge), contrasted with the more ideal loveliness and greater refinement of Giorgione's (Dresden) and Cariani's (Hampton Court). Giorgione's most important follower was Sebastian del Piombo (*circa* 1485–1547) who became the loyal slave of Michelangelo

in Rome about 1510. Del Piombo far outstripped his fellow-Venetians in zeal for anatomy, yet he was reined in by a certain laziness and disinclination to dissect.

Beyond the Alps also, are multiplied examples in sculpture and painting of accidental modes of anatomic illustration; beginning with Burgundian and Languedoc sculpture, and Flemish and Rhenish painting. The "Adam and Eve" on the Ghent altar by Jan Van Eyck (*circa* 1390–1441); the "Thief on the Cross" at Frankfort, work of the Master of Flemalle (active, 1420–38); "The Descent from the Cross" by Roger Van der Weyden (1400–1464) now in the Escorial; these introduce a long series of masterpieces in the naturalistic Northern manner which found expression later in such works as the "Neptune and Amphitrite" by Jan Gossart (1516) and the purely anatomical pen sketches of Peter Brueghel (1525–69). In Germany, Albrecht Dürer painted the figure according to the strict canons of proportion which he himself laid down. His "Adam and Eve" in the Prado (1507) executed on his return from Italy, easily transcends the efforts of Lucas Cranach and other contemporaries, who repeatedly tried to parallel the performance. The school of Dürer deserves special study from the angle of the cult of science, and because of the very close relations existing between members of that school and the mathematicians and physicians of Nuremberg, Augsburg, and Strassburg. It should be mentioned too, that Cranach, in addition to his active school directorship at Wittenberg, directed a prosperous drugshop there for many years. In Germany, as in Italy, art continually kibed the heels of medicine. We may not stop to examine the complex of these relationships, interpenetrating and important as they are. Burgkmair, Shauffelein, and Grien should be studied, with all their kin and kind. The "Hercules and Antaeus" and the "Allegory of Music" by Hans Baldung Grien give the summation of Dürer's mensural method of plotting the unveiled human figure. Perhaps the most acute and telling masterstroke of realism ever set within the limits of a narrow panel is the "Dead Christ" by Hans Holbein, The Younger, painted in 1521, now in the museum at Basel.

To return to Florence, it would seem first and last that the one fixed trysting place for art and science lay in that region round about the Arcispedale Santa Maria Novella, scene of the labors of Domenico Veneziano, Piero della Francesca, Andrea del Castagno, Alessio Baldovinetti, and Ghirlandaio. In the "Lily Pharmacy," hard by the hospital, was born Cosimo Roselli (1439–1507) sound craftsman, founder of a prolific school which welcomed the teachings of the new anatomy. His

ablest pupils were Piero di Cosimo (1462–1521) and Andrea del Sarto (1486–1531), keen students of anatomy, according to Vasari. A critic might interpolate thus: Vasari in his *Lives of the Painters* is prone to overemphasize these interests, for he was a kinsman of Signorelli and a pupil of Michelangelo. But we can generally check his statements made in this vein, by the direct evidence of drawings and other material remains left by the artist in question; in the case of Piero, the Uffizi drawing of a dead man's head is sufficiently convincing. Andrea del Sarto, in turn, taught artistic anatomy in his own school, beyond cavil of doubt. It was from him that Pontormo learned, and Franciabigio, and Rosso Fiorentino, who furnished the bulk of the illustrations in the anatomy of Charles Estienne (published by Simon de Colines, Paris, 1545).

Men of the central Italian tradition went serenely on, subtly recharging themselves with the primary inspiration of the supreme masters, Leonardo, Michelangelo, and Raphael. This triumvirate had hastened the spread in widest commonality of that dominant idea of Leon Baptista Alberti, namely, that artists should study nature in a truly scientific spirit. What ardors and endurances for science, what trials in the fiery furnace, had these three not passed through—Leonardo in particular! Florentines well remembered how, in the year 1505, the city had gone down in entire submission before Leonardo's divinely drawn cartoon for "The Battle of the Standard" and the competing cartoon by Michelangelo, "The Surprise, by the Pisans, of Florentine Soldiers Bathing in the Arno." "One of these cartoons was placed in the Medici Palace and one in the Pope's Hall; and while they could be seen there, they were the school of all the world" wrote Benvenuto Cellini. So decisive was the display, by these establishers of dissection, that there was no room thenceforth for faulty drawing of the nude figure in action. Many men in Florence, Milan, and Rome knew of Leonardo's favorite project to publish exhaustive researches in human and comparative anatomy—a project crushed under the Tarpeian weight of his materials, amassed in thirty-three years of intermittent dissection and gathered in one hundred and twenty volumes of drawings and descriptive notes. Of his fifty dissections, the first series was performed in the Arcispedale Santa Maria Novella at Florence, next at Milan at the Ospedale Maggiore and Collegio dei Fisici, with Della Torre, and finally (1514–15) at the Santo Spirito at Rome. There his work had been brusquely interrupted by command of the Pope, on complaint of a German, and he accepted the invitation of Francis I to live in France. It was during

his second stay at Milan that he made notation in his MS: "This winter of the year 1510 I hope to complete the whole of this anatomy." But we find him still dissecting four years later in his sixty-second year, in the winter of 1514–15, the winter on whose last December day Andreas Vesalius was brought into the world. Whether Vesalius saw or did not see the work of his great precursor, before the dispersal of these scientific treasures by Melzi's unblest son, remains a vexed question. Granting that Vesalius made use of even some small part of Leonardo's scheme, then may we say that the progress of science is not as faltering and discontinuous as, on the surface, it appears to be at this point in the history of anatomy. The influence of Leonardo upon practical anatomy is decisive; he steps into a place of intolerant central glory.

Less esoteric and secretive in this matter than Leonardo, Michelangelo wielded a tremendously direct influence upon the practice among artists of preparatory anatomies. Upon this question the young giant fell with world-shaking impact, creating a seismic disturbance over the whole field of art. He ruined his health in feverish dissections covering a period of sixteen years. Condivi, his pupil, says of him:

> Desiring to learn from nature herself he set her up before him as the true example. There is no animal whose anatomy he did not desire to study, much more, that of man, so that those who have spent all their lives in that science, and who make a profession of it, hardly know so much of it as he.

Condivi's closing comment is more than the mere personal puffery of extravagant admiration; it is true, not only of Michelangelo but of numbers of others in and out of his immediate following. Listen to Vesalius. Having just spoken of an anatomy performed on a Florentine patrician, there comes this peevish outburst:

> As for those painters and sculptors who flocked around me at my dissections, I have never allowed myself to get worked up about them to the point of feeling that I was less favored than these men, for all their superior airs.[1]

Montorsoli may be regarded as most adept in anatomy, in the group of Michelangelo's fellow-workers. In all probability it was he who executed the figures of the healing Saints Cosimo and Damian, flanking the Medicean tomb. His statues are essays in anatomy. At Genoa, at work on a great statue of the admiral Andrea Doria, we find him consorting with members of the medical guild in the cloisters of Santa Maria della Vigneis, and doing certain dissections there. From Rome, Sebastian del Piombo writes to Michelangelo: "I pray you remember to bring along some studies for me: faces, legs, body or arm, which I have

[1] "Letter on China Root," Basel, 1546, p. 194.

wanted, as you are aware, for so long a time." This appeal illustrates Bode's view:

> Michelangelo's overpowering and extraordinary genius began to dominate plastic art before the sculptors had attained to full knowledge of the laws of the anatomy of the human body. Andrea Sansovino, already, in his later works is wholly dependent on Michelangelo, in particular the frescoes of the Sistine Chapel; and this is still more the case with Andrea's pupil, Jacobo Sansovino, and the rest of the Florentine sculptors of that period, scarcely one of whom was able to develop upon his own individual lines.[1]

Yet one of the neatest *écorché* figurines in existence, a gem of consummate modeling of a dancing male figure, *excoriato a cuti*, has very recently been attributed to Jacobo Sansovino. It will bear comparison with the crouching *écorché* attributed, with little trace of reason, to Michelangelo. Another admirer of the great man, creator of the "Perseus," Benvenuto Cellini, always insisted in his writings that the essential thing in art was, "thoroughly to understand how to paint the nude." Cellini's diary also throws much light upon the points of contact between artists and physicians, for at Rome he was intimate with Berengario da Carpi (in whom he finds a commendable knowledge of design), and shared his Paris residence for eight years with the Florentine anatomist Guido Guidi (Vidius), one of the teachers of Vesalius, and a son-in-law of Ghirlandaio.

In deliberate rivalry with Michelangelo, strove Baccio Bandinelli, a pupil of Leonardo's friend, the sculptor Rustici. When Sebastian del Piombo painted the huge portrait of Bandinelli,[2] he put in his hand an expressive symbol of the sculptor's art, a cartoon of two nudes of highly developed musculature done in red wash or chalk. Under Bandinelli and Jacobo Sansovino studied Ammanati, whose ineffectual strivings only served to show all workers in the round how vain was their effort to recapture the Titanic conceptions and execution of Michelangelo. "When for their nudity Bandinelli's 'Adam and Eve' were removed from the high altar in Florence and when the aged Ammanati sent his abject apology to the Academia del Disegno expressing his 'acerbissimo dolore e pentimento' for certain nude figures on Florentine fountains, and the custom of adding zinc drapery loin cloths became widespread—then the reaction against anatomy and the nude may be said to have set in."[3]

[1] *Florentine Sculptors of the Renaissance*, London, 1910, p. 11.

[2] Finway Court Coll.

[3] Balcarres, *The Evolution of Italian Sculpture*, London, 1909, chap. iv, "Anatomy and the Nude," *et passim*.

There remains the flayed figure of St. Bartholomew by Marco D'Agrate in the cathedral at Milan,[1] marking the summit of misplaced and tasteless brilliance in this direction, inspired by that analogous earlier work by Giovanni Battista da Sesto at the right hand of the portal of the Certosa Pavese. There remain, too, the assiduous labors on anatomic preparations and myologic models, of the two artists Alessandro Allori and Il Cigoli, the latter of whom unhinged his mind from too close application to dissections. As late as 1660 the French sculptor Pierre Puget[2] (who spent seven years in Genoa) wrote to his patron Louvois, "I am also meditating a group of Apollo flaying Marsyas, in order to represent a kind of anatomy, a thing highly appreciated among sculptors and painters."

To turn again to painting. The Venetian colorists magically indicated the outline of the figure by varying gradations of tone. The figures in Giorgione's "Fête Champêtre" are color surfaces for the play of light. Tintoretto often lost the graphic pattern of the figure entirely, in a welter of chiaroscuro and confusing illumination. These crepuscular mysteries of light fortunately failed to sway other minds in the same degree. Correggio (1494–1534) showed the highest virtuosity in exquisite modeling of the human figure. His "Leda" (Berlin) is outlined in fluid, air-bathed tones; his "Io" (Vienna) and "Danae" (Borghese) reveal extraordinary delicacy in melting gradations of form and color, bathed in sifting light and almost visibly flowing air. These creations (beloved of gods and men) are separated by diameters of the solar system from the parvenu nudes of Lucas Cranach. Following the death of Michelangelo (1564) came the Mannerists, who need not detain us, for they studied nature no longer; they studied instead, the wilfulness and arbitrary choice of form in Michelangelo's later cartoons. From their vapid exhibitions of muscular anatomy misunderstood, pass to the eclectic school of the Carracci, at Bologna, where a sound system of anatomy was taught by charts, models, and dissections, preparatory to drawing from the nude. The sombre Ribera (1588–1656) painted the flayed St. Bartholomew many times with horrible truth and power. Indeed, when his first "Martyrdom of St. Bartholomew" was exhibited to the Neapolitan crowd from the balcony of his father-in-law's house a riot ensued. Ribera handled this congenial theme with dark ferocious competence, easily excelling his masters Ribalta and Agostino Carracci (Sutherland Gallery, "St. Bartholomew"). We have an etching,

[1] See *La Scultura nel Duomo di Milano*, Milan, 1908, p. 193.

[2] See "Marsyas," Metrop. Mus., N.Y.; consult *Mus. Bull.*, Vol. XIV, March, 1919.

from his hand, of the same grewsome theme. Ribera's drawings bear witness to his deep interest in anatomy; he doubtless knew every line of Michelangelo's St. Bartholomew in the "Last Judgment," holding forth his skin in one hand, and grasping the knife, symbol of his martyrdom, in the other. Velasquez (1599–1660), the first to work in oil, painted the nude all too seldom (National Gallery, "Venus and Love") whereas Rubens (1577–1640) seldom missed an opportunity—his female nudes are literally legion, rampant in every collection in Europe.

Like the Laocoön, the sculptures and Sistine frescoes of Michelangelo represent the culmination of a period, the period of physiological and psychological anatomy, which was empirically studied and triumphantly mastered by the Greeks and acquired its scientific foundation in the anatomical drawings of Leonardo da Vinci. All that the plastic and graphic arts could convey of the sensation of reality, the emotional realization of volume, weight, and movement by representation of the violently twisted musculature of the male body and the purposeful deformation of its parts, is rendered in these immortal works, something which no mere static photograph, say of wrestlers in violent conflict, could ever simulate. What is summarized by Michelangelo could only be sensed in a continuous motion picture of such actions, reeled off at slow tempo, for physiological analysis. In Rubens, the rhythmic organization of tactile volumes and the rendering of the sensation of stress and movement conveyed by the modification and deformation of volumes impinging upon one another, reached its highest development. In the long intervening period between Michelangelo and Rodin, between Rubens and Renoir, accurate representation of the nude was confined mainly to the soft, rounded contours of the female body, i.e., to surface anatomy. This preoccupation was due, in part, to the emancipation of art and artists from the early medieval prejudice against the plastic representation of the body *in naturalibus*, so evident in Gothic art, and latterly to the ever-increasing exaltation of the fair sex in the successive periods. "The nude human figure," says Berenson, "is the only object which in perfection conveys to us values of touch and particularly of movement. Hence the painting of the nude is the supreme endeavour of the very greatest artists; and when successfully treated, the most life-communicating and life-enhancing in existence."[1] But the true vehicle for the surface representation of muscular anatomy and its underlying bony structures is the male body. In the female body, which is physically and physiologically an "adiabatic system"

[1] Berenson, *The Central Italian Painters of the Renaissance*, New York, 1897, pp. 77–78.

or storehouse of energy, not specially intended for violent motor activity, the musculature is usually flabby and little developed, except in athletics or strenuous occupations. Artistic representation of its suave contours is usually effected by accounting for the depositions of subcutaneous fat, which set in at puberty and usually go on increasing up to the change of life. Countless variations have been played upon this theme, the recital of which is part of the story of modern painting.

The history of modern painting, one of the greater glories of modern France, is briefly as follows: In the early part of the nineteenth century, a definite and determined reaction against the erotic pictures of Boucher, Fragonard, and Greuze was ushered in by Vien and apotheosized by David. Austere, prudish, insipid themes from Greek and Roman history became the fashion. The classical tradition of the *méthode David* was continued by Ingres, a superlative draughtsman, whose pencil sketches make him, in Huneker's phrase, "the greatest master of pure line who ever lived." With the advent of Géricault and Delacroix, French art broke away from the stiff formal tradition, with its historical or literary subject-matter. Géricault was almost the only artist in the nineteenth century who dissected, and he dissected even the viscera. With Géricault and Delacroix came two of the fundamental postulates of modern painting, viz., unrestricted freedom in the choice of subjects and the feeling that color rather than line is its true means of expressing form, volume, depth, light, air, and motion. Emancipation from formal or literary subject-matter was largely due to the Spanish artist Goya, who boldly took his themes from the varied life about him, painting almost every conceivable subject, and, in his diabolical etchings, revived the intensely dark backgrounds of Rembrandt and Hals. From Goya stemmed Gustave Courbet, who was reviled all his life for his daring choice of unconventional subjects and who was one of the earliest of the great landscape painters of France. From the Spanish tendency came also the caricaturist Honoré Daumier, whose gloomy backgrounds again suggest Rembrandt and Goya, and whose nude studies of bathing and wrestling scenes introduced a tendency of colossal importance in recent painting, namely, the rendering of mass in motion, of the sensations of tactile volume, contour, weight, and muscular exertion by the sheer and rugged blocking out of dark tones against the light. It is the physiological anatomy of Michelangelo rendered in a new medium. Another product of the Goya tradition was Edouard Manet, who exhausted all the possibilities of unconventional subject-matter ("After Manet, there was nothing new to paint"), who eliminated nonessentials

to the point of elliptical portraiture of the face, but who, with all his feeling for surfaces, never achieved form, depth, and volume in three dimensions. With Manet, came the great landscape painters of the Barbizon School and, inspired by the English Turner, the Impressionists, better termed the Luminists, who sought to represent sunlight, heat, wind, and flowing water by means of color alone. The Impressionist movement culminated in Paul Cézanne, who strove to represent form, subjective solidity, and movement itself by the juxtaposition of planes of color. As Berenson says, Cézanne gave tactile values even to the sky.[1] These new devices were, most of them, utilized in triumphant synthesis in the last paintings of the aged Paul Renoir, defined by Wright as "among the greatest paintings of all time." The summit having been attained, decadence at once set in. Cézanne and Whistler had been influenced by the Japanese. Matisse reverted to the flat two-dimensional art of Persia. Out of African negro sculpture and its angularities came Picasso and the Cubists, who discarded color in favor of block representation in two tones and volume in favor of multilateral vision, or the simultaneous presentation of many aspects of the same object ("Nude Descending a Staircase"). The Futurists, meanwhile, aspired to "empathy" or the identification of the spectator with a series of successive or simultaneous actions supposed to be represented in the picture ("Dynamism of an Auto"). This was the "cosmic tarantella," the chaotic Walt Whitman view of nature, which Berenson derides as the logical opposite of true art, the essence of which, from the time of the Greeks, has been selection. Finally, in the work of the Synchromists, all subject-matter in the shape of recognizable objects was eliminated in favor of experiments in juxtaposition of primary colors, and the sterilizing process was complete. Viewed historically, Cubism and Synchromism are technical experiments toward the purification of painting as the art of conveying sensations of form, volume, and movement by means of color alone.[2] In sculpture, Falguière followed the traditions of Canova and Houdon; Rodin revived the muscular anatomy of Michelangelo.

The effect of the purifying process upon anatomical representation in painting and sculpture was characteristic.

To a surprising science of anatomy, acquired by dissecting, the great Florentine artists added their own intuitions about the dynamics of

[1] Berenson, *The Central Italian Painters of the Renaissance*, New York, 1897, p. 101.

[2] This argument has been derived, in the main, from Willard Huntington Wright's *Modern Painting* (New York, 1915), which does for modern French painters what Berenson's volumes do for the Italian painters of the Renaissance.

painting. The success of Giotto, Masaccio, Michelangelo, in conveying the physical sensation of solidity and of violently opposing forces was inherent in their genius, a matter of intuition alone. Their knowledge of anatomy was great, but only Leonardo had any physiological knowledge of the interplay of antagonistic muscles. To purify painting by the scientific study of color, to render the sensations of light, volume, solidity, weight, and movement by the orchestration of color alone, was the ambition of all truly modern painters, from Daumier to Cézanne; and Cézanne, as Wright says, "halted at the gateway of great composition," because, like Gaugain, he took up painting too late in life. Under these conditions, representation of the nude became less a matter of anatomic knowledge and study than of color instrumentation and dynamics. The nudes of Daumier have actual mass, weight, and solidity; like his caricatures they were "great pieces of rugged flesh which had all the appearance of having been chiseled out of a solid medium with a dull tool. . . . . The drawing came afterward as a direct result of the tonal volumes." (Wright). Manet's "Dejeuner sur l'Herbe," on the other hand, is only a two-dimensional affair of brilliant surfaces. One of the few modern female nudes in which musculature is apparent, it is none the less as flat as a pancake. In the nudes of Renoir, tangibility, bulging volume, the sensation of mass and weight, as in a living body, are achieved by means of color alone. Cézanne's rough *croquis* of nudes in motion look, many of them, like the drawings of a madman—an artist's experiments in the dynamics of vision. The sketches of Bakst are a wild carnival of *le mouvement* in two dimensions. And all these men had their forebears. Renoir derives from Correggio, Rubens, Boucher, and the rock sculptures in the Indian grottoes; Daumier from Rembrandt and Goya; Rodin from Michelangelo; the block representations of the Cubists from the figurines of the Crô-Magnon artists, from negro sculpture, from Dürer's anthropometric diagrams. The study of the musculature of the back in Courbet's "Femme de Munich" is singularly like certain canvasses of Rubens. The reclining and semi-recumbent figures of Michelangelo, Correggio, Titian, Tintoretto, and other Italians, a pose which for three centuries was a motif in books of anatomic illustration from Berengario da Carpi to Gautier d'Agoty, were repeated by Velasquez and resumed by Boucher, Fragonard, Goya ("Maja nuda"), Courbet, and Renoir. Meanwhile, alongside of the conscious effort to purify painting by making it a matter of color dynamics alone, other tendencies sprang up. Gaugain, Degas, Rops, Toulouse-Lautrec, studied the nude from curious angles, ethnic, social, latterly

pathological, and here Fletcher's dictum that the true content of "artistic anatomy" is physiology and external pathology becomes singularly apposite. Gaugain's studies of Tahitian men and women are genuine contributions to ethnology,[1] like Greek statuary, Holbein's English faces, Lucas Cranach's slant-eyed Wittenberg maidens, Rubens' negro, Raeburn's Scots, Goya's Spaniards, Defregger's Tyrolese, Zorn's Swedes, Alfred Stevens' Belgians, Reinhold Begas' Prussian girls, Sargent's Nilotic woman, Sichel's "Miss Fai," or Zuloaga's "Marcelle Souty." The predilection of Correggio, Andrea della Robbia, Andrea del Sarto, and Rubens for naked bambini has afforded solace to scores of modern German artists, notably in Moritz von Schwindt's cartoons for frescoes in the Royal Palace at Munich. Rodin's "La Belle Heaulmière" reproduces all the horrors of Villon's ballade, and the jaded ugliness of prostitutes has been vulgarized by Rops, Forain, Louis Legrand, and Toulouse-Lautrec. Dürer's "Four Naked Women" and Rembrandt's nudes engendered, in fact, a whole school of modern pictures, in which the female body is seen as deformed and ruined by advancing age, maternity, change of life, grinding toil, vice, or prostitution. Degas, who shut himself up all his life to paint ballet girls, race horses, and milliners, achieved the culmination of this tendency in his pictures of ugly women bathing in tubs. Personally, in his "benevolent malice" and reconcilement to the boredom of life, he was the artistic counterpart of the novelist Huysmans, of the catlike temperament, described by Arthur Symons as "courteous, perfectly polite, almost amiable, but all nerves, ready to shoot out his claws at the least word."

> Perhaps it is only a stupid book that someone has mentioned, or a stupid woman; as he speaks, the book looms up before one, becomes almost monstrous in its dullness, a masterpiece and a miracle of imbecility; the unimportant little woman grows into a slow horror before your eyes. It is always the unpleasant aspect of things that he seizes, but the intensity of his revolt from that unpleasantness brings a touch of the sublime into the very expression of his disgust. . . . . He speaks with an accent as of pained surprise, an amused look of contempt, so profound, that it becomes almost pity, for human imbecility.

Such have been the tendencies of recent painting of the nude, the apotheosis of the ugly and the disagreeable, running strangely parallel with the substitution of the photograph and the dissected cadaver in place of hand-drawings for the teaching of anatomy. Our thesis,

[1] Fletcher (*Art and Anthropometry*, p. 8) notes the "autotypic instinct . . . . the tendency of man in painting or sculpture to reproduce the type of race to which he belongs and the extreme difficulty with which he depicts the type of other races." This subjectivity is nowise true of Gaugain's Polynesians. They are true objective ethnic studies.

however, is to the effect that genuine anatomic illustration arose not in didactic hand-drawings made by physicians, but without didactic intention, in the sculptures and figure paintings of the great Florentines, in immortal beauty comparable only with the statuary of the Greeks and the Gothic *imagiers*.

In the words of Berenson:[1]

> What brought about this change? In the first place, the Serpent, that restless energy which never allows man to abide long in any Eden, the awakening of the scientific spirit. Then the fact that, by a blessed accident, much, if not most, of this awakened energy was at first turned not to science but to art. The result thereof was Naturalism, which I have defined elsewhere as science using art as the object of its studies and as its vehicle of expression. Now science, devoting itself, as it earnestly did at the beginning of the fifteenth century, to the study of the shapes of things, did not take long to discover that objective reality was not on the side of the art then practiced. And, thanks to the existence at that moment of a man not less endowed with force to react against tradition, than with power to see—a power, I believe, unparalleled before or since—thanks to this one man, Donatello, art in an instant wrenched itself free from its immediate past, threw to the winds its whole medieval stock of images, and turned with ardour and zeal to the reproduction of things as research was discovering them to be. . . . .
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> Created by Donatello and Masaccio, and sanctioned by the Humanists, the new canon of the human figure, the new cast of features, expressing, because the figure arts, properly used, could not express anything else, power, manliness, and stateliness, presented to the ruling classes of that time the type of human being most likely to win the day in the combat of human forces. It needed no more than this to assure the triumph of the new over the old way of seeing and depicting. And as the ideals of effectiveness have not changed since the fifteenth century, the types presented by Renaissance art, despite the ephemeral veerings of mere fashion and sentiment, still embody our choice, and will continue to do so, at least as long as European civilization keeps the essentially Hellenic character it has had ever since the Renaissance.

[1] Berenson, *The Central Italian Painters of the Renaissance*, New York, 1907, 62, 66.

III. ANATOMICAL ILLUSTRATION SINCE THE TIME OF CHOULANT

By Fielding H. Garrison

When Choulant's *History* was published, about the middle of the nineteenth century (1852), modern scientific medicine had gained its stride, and was already moving swiftly toward the goal of a well-organized body of real knowledge, capable of continuous growth and development. The period was a brilliant one in respect of original discoveries and inventions, and the publication of Schwann's Cell Theory (1839) and of such anatomic treatises as those of Henle (1841), Hyrtl (1846), and Pirogoff (1852) established new departures, little known to Choulant, such as histology, morphology, the study of anatomy by means of frozen sections, the pursuit of topographic and cross-section anatomy as ends in themselves, the use of photography, lithography, electroplating, and other reproductive processes. While the pencil and the brush were freely utilized in illustrating such textbooks as those of M. P. C. Sappey (1850–64), Henry Gray (1859), Carl Gegenbaur (1883), Leo Testut (1889–91), and Karl von Bardeleben (1896), or in such surgical topographies as those of J. F. Malgaigne (1859), Carl Heitzmann (1876), Luther Holden (1876), George McClellan (1891), or Bardeleben (1894), direct photography of unusually good specimens or preparations gradually gained a footing. Jakob Henle (1809–95), in his *Handbuch der systematischen Anatomie* (1866–71), illustrated by himself, introduced the new idea of architectural drawings, in plan and elevation, giving only so much of a structure as is necessary for its comprehension. Wilhelm His, Joseph Leidy, Joseph Lister, and many others made their own drawings. The soft gray wood engravings used by Henle and Gray set the pace for a long period. The new sciences of anthropology and ethnology, with their many photographic albums of crania[1] and of the physical habitus of different races, in particular such treatises as those of Heinrich Ploss on women (*Das Weib*) and children (*Das Kind*, 1877),

[1] Notably those of American Indian (1839) and Egyptian crania (1844) by Samuel George Morton (1799–1851), of Russian crania by Carl Ernst von Baer (1859), of Swiss crania by Ludwig Rütimeyer and Wilhelm His (1864), of Finnish crania (1878) and Swedish crania (1900) by Magnus Gustav Retzius, of Bohemian crania by Ludwig Matiegka (1891), of North American Indian crania by Rudolf Virchow (1892), of ancient Swiss crania by T. Studier and E. Bannworth (1894).

gave a new impetus to artistic anatomy. Direct photography of the nude was employed in illustrating scores of books on this subject, notably in the works of Carl Heinrich Stratz and the anatomic treatise of Julius Kollmann (1866). The day of massive, expensive atlases of wood, copper, steel, and mezzotint engravings is over. Even historical treatises on anatomic illustration, such as those of Duval and Cuyer (1898) or Weindler (1908), merely reproduced the classical pictures of the past by means of photography.

It remains to give some brief bibliographic account of distinctive examples of anatomic illustration since the time of Choulant. Those selected and subjoined *seriatim*, in chronologic order, do not by any means constitute an exhaustive list, but are to be taken as illustrative and representative of modern work in technical anatomic illustration and artistic anatomy; most of these are illustrated in the ordinary woodcut process employed by Henle and Gray, or in electrotype or zincograph. Hence, descriptions of the books are given in a few instances only. Where a complete bibliographic description of a work is not given, the original edition has not been accessible.

ILLUSTRATED TREATISES ON GENERAL ANATOMY

GODMAN, JOHN D. (1794–1830). Anatomical investigations, comprising descriptions of various fasciae of the human body. Philadelphia: H. C. Carey and I. Lea, 1824, 8°. xiii+14+134 pp., 10 pl.

One of the earliest original investigations by an American, the unfortunate and short-lived Maryland anatomist. Illustrated with 7 copperplates, from drawings by J. Drayton, Rembrandt Peale, Lesueur, small in size and of no outstanding merit.

———. Contributions to physiological and pathological anatomy; containing observations made at the Philadelphia Anatomical Rooms. Philadelphia: H. C. Carey and I. Lea, 1825, 8°. 86 pp., 3 pl.

QUAIN, JONES (1795–1851). The elements of anatomy. London, 1828, 8°.

———. Anatomical plates. Division I. The Muscles. London, 1839, fol. 2 v., 100 pp., 5 pl.

——— AND WILSON, W. J. ERASMUS. A series of anatomical plates; with references and physiological comments, illustrating the structure of the different parts of the human body. London, 1836–42, fol., 2 v.

WILSON, SIR WILLIAM JAMES ERASMUS (1809–84). Practical and surgical anatomy. London: Longmans, Green (*et al.*), 1838, 8°. 492 pp.

———. The anatomist's vade mecum: a system of human anatomy. London: J. Churchill, 1840, 8°. xxiv, 595 pp., 1 pl.

HENLE, JACOB (1809–85). Allgemeine Anatomie. Lehre von den Mischungs- und Formbestandtheilen des menschlichen Körpers. Leipzig: L. Voss, 1841, 8°. xxiv+1048, pp., 1 l., 5 pl. (Forms Vol. VI of SOEMMERRING, S. T., Von Baue des menschlichen Körpers. Leipzig, 1841.)

HENLE, JACOB (1809–85). Handbuch der systematischen Anatomie des Menschen. Braunschweig: F. Vieweg und Sohn, 1856–73, 8°, 3 v.

The most scientific treatise on anatomy in its day, by the professor of anatomy at Göttingen, the great master of histology. Illustrated by its author after the method employed in his blackboard demonstrations, viz., the elliptical "architectural drawing," which gives only so much of a structure in light and shade as is necessary for its comprehension, and freely utilizes plan and elevation in demonstrating the relations of structures in cross-section through different axes and planes.

———. Anatomischer Hand-Atlas zum Gebrauch im Secirsaal. Braunschweig, 1871–76, 8°. 6 Hefte.

MORTON, SAMUEL GEORGE (1799–1851). An illustrated system of human anatomy, special, general, and microscopic. Philadelphia: Grigg, Elliot & Co., 1849. xix+17+642 pp.

MOUAT, FREDERIC JOHN (1816–97). An atlas of anatomical plates of the human body, with descriptive letterpress in English and Hindustani. Calcutta: Sanders & Cones, 1849, fol. 1 p.l., 64 pp.

SMITH, HENRY HOLLINGSWORTH (1815–90). Anatomical atlas, illustrative of the structure of the human body; under the supervision of WILLIAM E. HORNER. Philadelphia: Lea & Blanchard, 1849, 8°. 186 ff.

FRORIEP, ROBERT (1804–61). Atlas anatomicus partium corporis humani per strata dispositarum, imagines in tabulis XXX, ab AUGUSTO ANDORFFO delineatas ferroque incisas exhibens. Weimar, 1850, fol. 5 fasciculi.

SAPPEY, MARIE PHILIBERT CONSTANT (1810–96). Anatomie, physiologie, pathologie des vaisseaux lymphatiques considerés chez l'homme et les vertébrés. Paris: A. Delahaye et E. Lecrosnier, 1874–85, fol. 136 pp., 48 pl.

———. Traité d'anatomie descriptive. Paris: V. Masson, 1850–64, 12°. 3 v. 2d ed. 4 v. Paris: A. Delahaye, 1867–72.

———. Atlas d'anatomie descriptive. Part I; ostéologie, arthrologie. Paris: V.-A. Delahaye et Cie. iii pp., 1 l., 38 pl. with text on back of plates.

TURNER, SIR WILLIAM (1832–1916). Atlas of human anatomy and physiology. Selected and arranged under the superintendence of JOHN GOODSIR. Edinburgh: W. & A. K. Johnston, 1857, fol. 1 p.l., 8 pl.

GRAY, HENRY. Anatomy descriptive and surgical. The drawings by H. V. CARTER. The dissections jointly by the author and DR. CARTER. London: Longmans, Green & Co., 1859, 8°. xxxii+754 pp.

The standard modern textbook of the English and American medical student, dedicated to Sir Benjamin Brodie, now in its twentieth edition (1918). The drawings, by H. Vandyke Carter, are of unusual merit and of great didactic value.

LEIDY, JOSEPH (1823–91). An elementary treatise on human anatomy. Philadelphia: J. B. Lippincott Co., 1861, 8°. 663 pp. 2d ed. Philadelphia: J. B. Lippincott Co., 1889, 950 pp.

By the greatest of American anatomists and biologists. Written for students (2d ed., 1889) and illustrated by the author himself. The illustrations are small but exquisite in execution and are, many of them, after Henle's idea, confined to only so much of a given structure as is comprehensible to the student.

PIROGOFF, NIKOLAI IVANIVUCH (1810–80). Chirurgische Anatomie der Arterienstaemme und Fascien, neu bearbeitet von JULIUS SZYMANOWSKI. Leipzig und Heidelberg: C. F. Winter, 1861, 8°. iv+243 pp., 50 pl.
Illustrated with colored lithographs by C. Schmiedel from drawings by F. Schlater.

HEITZMANN, CARL. Die descriptive und topographische Anatomie des Menschen. Wien: W. Braumüller, 1870, 8°. xii+232 pp.

HYRTL, JOSEPH (1811–94). Die Corrosions-Anatomie und ihre Ergebnisse. Wien: W. Braumüller, 1873, 4°. viii+253 pp., 18 col. pl.
The classical work on the corrosive method. Begins with a history of the development of the process by Ruysch and his predecessors, Bidloo, Cowper, and Lieberkühn; the technic of corrosion and its results in demonstrating the finer details of anatomic structures. The colored lithographic plates, from drawings by C. Heitzmann, are of the finest order, representing the tympanum, lachrymal apparatus, bronchi, portal vein, bile ducts, kidney, and other structures, with blood vessels.

WITKOWSKI, GUSTAVE JULES A. (1844——). Anatomie iconoclastique. Atlas complémentaire de tous les ouvrages traitant de l'anatomie et de la physiologie humaines, composé de planches découpées, coloriées et superposées. Paris: 1874–88, fol. 12 parts.
Consists of life-size superposed plates of the human body, followed by others representing the principal organs.

GODLEE, RICKMAN JOHN. An atlas of human anatomy. London: J. & A. Churchill, 1877–78, 8°. 196 pp. fol. 20 l., 20 pl.

VON KLEIN, CARL HEINRICH. Tabulae anatomicae osteologicae. Cincinnati: Lithographic Company, 1883, 8°. 3 p.l., 32 pl.

GEGENBAUR, CARL (1826–1903). Lehrbuch der Anatomie des Menschen. Leipzig: W. Engelmann, 1883, 8°. xvi+984 pp., 1 l.
Illustrated with 558 partly colored woodcuts.

BRAUNE, CHRISTIAN WILHELM (1831–92). Das Venensystem des menschlichen Körpers. Leipzig: Veit & Co., 1884, 8° and eleph. fol., 2 pts. viii+72 pp., 4 col. pl.; 24 pp., 4 col. pl.

WINDLE, BERTRAM COGHILL ALAN. A handbook of surface anatomy and landmarks. London: H. K. Lewis, 1888, 8°. x (1 l.)+134 pp.

TESTUT, JEAN LÉO (1849——). Traité d'anatomie humaine. Anatomie descriptive; histologie: développement. Avec la collaboration pour l'histologie et l'embryologie de G. Ferré et L. Vialleton. Paris: O. Doin, 1889–92, 8°. 3 v.

OWEN, EDMUND. A manual of anatomy for senior students. London: Longmans, Green & Co., 1890, 8°. viii+526 pp.

MCCLELLAN, GEORGE. Regional anatomy in its relation to medicine and surgery, Philadelphia: J. B. Lippincott Co., 1891–92, 4°. 2 v., xxii (1 l.)+436 pp.; xvi+414 pp., 97 pl.

PORRIER, PAUL (1853–1907), CHARPY, A. (*et al.*). Traité d'anatomie humaine Paris, 1892–1902, roy. 8°. 5 v.

MORRIS, HENRY. A treatise on human anatomy by various authors. Edited by ———. London: J. & A. Churchill, 1893, 8°. 1,310 pp.

Bardeleben, Karl (1849——), and Haeckel, Ernst. Atlas der topographischen Anatomie des Menschen für Studierende und Aerzte. Jena: G. Fischer, 1894, 8°. xx, 55 l., x, 128 pl. (with 128 woodcuts), 1 pl.

Cuyer, Édouard. Atlas-manuel d'anatomie élémentaire, démontrée à l'aide de planches coloriées, découpées et superposées. Paris: J. B. Baillière & fils, 1895, vi (1 l.)+56 pp., 27 pl.

Spalteholz, Werner (1861——). Handatlas der Anatomie des Menschen. Mit Unterstützung von Wilhelm His bearbeitet. Leipzig: S. Hirzel, 1895–1903, 8°. 3 v.

Illustrated with 750 parti-colored lithographs. Translated into English by Lewellys F. Barker [1900–1903].

Toldt, Carl (1840——). Anatomischer Atlas für Studierende und Aerzte, unter Mitwirkung von Alois Della Rosa. Wien und Leipzig: Urban und Schwarzenberg, 1896–1900, 8°. vi+718 pp., 230 pp.

Janošík, J. Anatomický atlas. v. Praze, 1897–1902, 8°.

Based upon original dissections.

Gerrish, Frederic Henry. A textbook of anatomy by American authors. Edited by ———. Philadelphia and New York: Lea Brothers & Co., 1899, roy. 8°. 917 pp.

Illustrated with 950 engravings in black and colors.

Krause, Wilhelm (1833–1910). Handbuch der Anatomie des Menschen, mit einem Synonymenregister. Leipzig: S. Hirzel, 1899–1901, 8°.

Cunningham, Daniel John. Textbook of anatomy. Edited by ———. Edinburgh and London: Y. J. Pentland, 1902. 8°. xxi+1,309 pp.

Illustrated by 824 parti-colored wood engravings from drawings by J. T. Murray, W. C. Stevens, and William Cathie.

Sobotta, Johannes (1869——). Altas der deskriptiven Anatomie des Menschen. München: J. F. Lehmann, 1904, 4°. viii (2 l.)+399 pp., 19 pl.

Taylor, Edward Henry. A treatise on applied anatomy. London: C. Griffin & Co., 1904, 8°. xxvii+738 pp.

Rabaud, Étienne (1868——). Anatomie élémentaire du corps humain. Paris: Schleicher frères, 1899, roy. 8°. viii+98 pp., 4 superimposed pl.

———. Atlas anatomique du corps de l'homme et de la femme. Paris: Schleicher frères et Cie., 1905. 4°. 7 superimposed pl., 8 l.

Broesike, Gustav (1853——). Anatomischer Atlas des menschlichen Körpers. Berlin: H. Kornfeld, 1900–1902, 8°. Parts 1–2.

Eisendrath, Daniel Nathan. A textbook of clinical anatomy for students and practitioners. Philadelphia: W. B. Saunders Company, 1903, 8°. 515 pp.

Von Bardeleben, Karl (1849–1918). Lehrbuch der systematischen Anatomie des Menschen für Studierende und Aerzte. Berlin und Wien: Urban und Schwarzenberg, 1906, 8°. xi+996 pp.

Has only 7 illustrations in the text.

———. Die Anatomie des Menschen. Parts I–V. Leipzig: B. G. Teubner, 1908–9. 12°.

Sommer, Ernst Friedrich. Anatomischer Atlas in stereoskopischen Röntgenbildern. Würzburg: C. Kabitzsch, 1906. 8°. 1 v., xii, 20 pl.

FROHSE, FRIEDRICH, BROESIKE, GUSTAV, BENNINGHOVEN, WILHELM. Anatomische Wandtafeln. Dresden: A. Müller, 1911–12, roy. 8°. 13 pl.

VAN GEHUCHTEN, ARTHUR (1861——). Cours d'anatomie humaine systematique. Louvain: A. Uystpruyst-Dieudonné, 1906–9, roy. 8°. 3 v.

PIERSOL, GEORGE ARTHUR (1856——). Human anatomy, including structure and development and practical considerations, by THOMAS DWIGHT, J. PLAYFAIR MCMURRICH (*et al.*). Edited by ———. Philadelphia: J. B. Lippincott Co., 1907, xx+2,088 pp., 1 pl.

Contains 1,734 illustrations, of which 1,522, by Hermann, Ludwig E., and Erwin F. Faber, are from original dissections.

DAVIS, GWYLLYM G. Applied anatomy. Philadelphia: J. B. Lippincott Co., 1910, 4°. x+629 pp.

Illustrated with 630 parti-colored drawings and photographs, mostly from original dissections, by Erwin F. Faber and Hermann Faber.

BERRY, RICHARD JAMES ARTHUR (1867——). A clinical atlas of sectional and topographical anatomy. Edinburgh and London: W. Green & Sons, 1911, fol. 2 p.l., 13 pp., 60 col. pl.

MERKEL, FRIEDRICH SIGMUND (1845——). Die Anatomie des Menschen, mit Hinweisen auf die ärztliche Praxis-Wiesbaden: J. F. Bergmann, 1913, 4°. 3 parts.

CROSS-SECTION ANATOMY (INCLUDING FROZEN SECTIONS)

DE RIEMER, PIETER (1760–1831). Afbeeldingen van de juiste plaatsing der inwendige deelen van het menschelijk ligchaam, zoo met opzigt tot derzelver ligging onderling, als ten aanzien hunner bepaalde aanraking tegen de wanden der holligheden waarin zii zich bevinden. Parts I–IV. 's Gravenhage: J. Allart en Comp., 1818, fol. 5 colored pl., 5 outline pl.

The first work in which frozen sections were utilized in anatomical illustration.

HUSCHKE, EMIL (1797–1858). Lehre von den Eingeweiden und Sinnesorganen des menschlichen Körpers. Leipzig: L. Voss, 1844, 8°. liii+949 pp., 2 pl. (Forms Vol. V of S. T. VON SÖMMERRING'S Vom Baue des menschlichen Körpers.)

By an eminent anatomist and embryologist, a pupil of Oken, and Loder's successor at Jena. Contains two copperplates, giving ten views of transverse sections through the neck, thorax, abdomen, and pelvis of the cadaver of an eighteen-months-old girl.

PIROGOFF, NIKOLAI IVANOVICH (1810–81). Anatome topographica sectionibus per corpus humanum congelatum triplici directione ductis illustrata. Petropoli: J. Frey, 1852–59, fol. and 8°. 4 pts. 796 pp., 213 pl.

The first important atlas of anatomy to be based on frozen sections. The first volume consists of life-size sections of the head, mostly in transverse planes; the second contains transverse and sagittal sections of the thorax; the third transverse, sagittal, and frontal sections of the abdominal cavity in both sexes; the fourth sections in three planes through the extremities and their joints. Although Pirogoff was ignorant of his predecessors in freezing methods, his work remains unsurpassed for practical use.

LEGENDRE, EUGÈNE QUENTIN (1823——). Anatomie chirurgicale homalographique. Paris: J. B. Baillière et fils, 1858, fol. 2 p.l., 45 pp., 25 pl.

Drawings made by the author from frozen sections of different parts of the body, taken in horizontal, sagittal, and oblique planes.

RUDINGER, NICOLAUS (1832–96). Topographisch-chirurgische Anatomie des Menschen. 1–4, Abth. and Supplement. Stuttgart: J. G. Cotta, 1877–79, roy. 8°. 721 pp., 183 pl.

Contains 73 illustrations of frozen sections from the adult and infant in the three principal planes, mostly photographic.

BRAUNE, CHRISTIAN WILHELM (1831–92). Topographisch-anatomischer Atlas. Nach Durchschnitten an gefrorenen Cadavern. Leipzig: Veit und Comp., 1867–72, fol. (Supplement). Die Lage des Uterus und Fötus am Ende der Schwangerschaft nach Durchschnitten an gefrornen Cadavern. Leipzig: Veit und Comp., 1872, fol. 4 l., 4 pl. 2. ed. 1875. English translation by E. BELLAMY, 1877. 3. ed. 1888.

A classical work, representing sections of the male and female body in three planes, from preparations made with a special freezing mixture of Braune's invention. The drawings were first made on tracing paper over a thin layer of ice covering the delineated structures.

DWIGHT, THOMAS (1843–1911). Frozen sections of a child. Fifteen drawings from nature by H. P. QUINCY. New York: Wood & Co., 1881, roy. 8°. v+66 pp.

A classical work of great importance in pediatrics, and the first American group of serial sections.

DALTON, JOHN CALL (1825–89). Topographical anatomy of the brain. Philadelphia: Lea Brothers & Co., 1885, fol. 3 v. in 1, vi (1 l.)+iv+iv+173 pp., 48 pl., 48 outline pl.

By the late professor of physiology in the College of Physicians and Surgeons (New York). Heliotype reproductions of photographs of fresh specimens, prepared by the author, with outline sketches from tracings made by Dr. Richmond Lennox. The photographs are of a superlative order and beauty, and made from specimens and cross-sections which could not be duplicated out of hand.

SYMINGTON, JOHNSON (1851——). The Topographical Anatomy of the Child. Edinburgh: E. & S. Livingstone, 1887, fol. 75 pp., 14 pl.

Life-sized colored plates, based upon frozen sections. Introduces the novelty of key-figures, showing the lines along which the sections were taken.

MACEWEN, SIR WILLIAM. Atlas of head sections. Glasgow: J. Maclehose & Sons, 1893, 4°. xiii+4 pp., 54 l., 53 pl.

Seven series of sections, three coronal, one sagittal, three transverse, of which one coronal and one transverse are from the child. The illustrations are copperplates from photographs. "As in all frozen sections, the saw has destroyed or obscured many of the finer details" (Eycleshymer).

RETZIUS, MAGNUS GUSTAV (1842——). Das Menschenhirn. Studien in der makroskopischen Morphologie. Stockholm: P. A. Norstedt und Söner, 1896, fol. 2 v., viii+167 pp., 1 p.l., 96 pl., 96 l.

EYCLESHYMER, ALBERT CHAUNCEY (1867——), SCHOEMAKER, DANIEL MARTIN (1867——). A Cross-Section Anatomy. New York and London: D. Appleton & Co., 1911, fol. 373 pp.

A superb production, giving views of 113 cross-sections, preceded by an excellent history of cross-sectional anatomy. The average position of the organs was evolved from eleven reconstructions by Paul Potter, the sections of the female pelvis were made by Carroll Smith and the drawings by Tom Jones, all of St. Louis University.

ARTISTIC ANATOMY

BERTINATTI, FRANCESCO. Elementi di anatomia fisiologica applicata alle belle arti figurative. Torino: P. Marietti, 1837, 2 v. 8°. Atlas fol. 43 pl.

One of the earlier works, illustrated by 43 lithographic plates, of a superior *facture*. The allegorical frontispiece (*allegorico frontespizio*) represents an instructor demonstrating the musculature of a flayed cadaver, suspended by the right arm, to a studio of seated pupils.

SQUANQUERILLO, COSTANTINO. Opera di anatomia pittorica. Roma: F. Lustrini, 1837–41, fol. 64 pp., 65 pl.

Described by Duval and Cuyer (*Histoire de l'anatomie plastique*) as an unfinished work, since only 9 of the 15 fasciculi of 4 plates each were "in circulation" or known to the authors. The copy, in the Surgeon General's Library, as above described, contains 65 plates. Many of these lithographs are taken from Albinus. The frontispiece represents two outline sketches of the male and female figure *en profil* on a placard supported by a skeleton and an *écorché*.

BEAN, RICHARD LEWIS. Anatomy for the use of artists. London: H. Renshaw. 1841, 8°. 47 pp., 10 pl.

PÉQUÉGNOT, AUGUSTE (1819–78). Anatomie ou description des formes de l'homme, exclusivement destinée aux peintres, sculpteurs et graveurs, et entièrement appliquée aux beaux-arts. Paris: Danlos, 1845, 8°. 47 pp., 24 pl.

One of the earlier works mentioned by Duval and Cuyer. The myological plates are superior to those representing the bones.

STORY, WILLIAM WETMORE (1819–95). The proportions of the human figure, according to a canon, for practical use. London: Chapman & Hall, 1866, roy. 8°. 3 p.l., 63 pp., 7 tab.

DUVAL, MATHIAS MARIE (1844——). Precis d'anatomie à l'usage des artistes, Paris: G. Quantin, 1881, 8°. 336 pp.

FLETCHER, ROBERT. Human proportion in art and anthropometry. Cambridge: M. King, 1883, 37 pp., 4 pl. 8°.

RIMMER, WILLIAM. Art anatomy. London: Kegan Paul, Trench & Co., 1884. fol. 2 p.l., 81 pl.

KOLLMANN, JULIUS CONSTANTIN ERNST (1834–1918). Plastische Anatomie des menschlichen Körpers, für Künstler und Freunde der Kunst. Leipzig: Veit und Comp., 1886, roy. 8°.

By the professor of anatomy at Basel. Illustrated with lithographs from hand-drawings, photographs from the nude, ethnic studies of facial features arranged *en échelon*, etc. The text, like Hyrtl's, is of unusual historic interest, and includes special chapters on the anatomy of the infant, human proportions, and ethnic morphology. Among the models used are Sandow, Rubinstein, and other celebrities.

CUYER, ÉDOUARD. Anatomie artistique du corps humain. Planches par le DR. FAU Paris: J. B. Baillière et fils, 1886. vii+208 pp., 17 pl.

ROCHET, CHARLES (1815–1900). Traité d'anatomie, d'anthropologie et d'ethnographie appliquées aux beaux-arts. Paris: Renouard, 1886, xii+276 pp.

Illustrated by pen drawings (in black and white and colors) by G. L. Rochet.

RICHER, PAUL (1849——). Anatomie artistique. Description des formes extérieures du corps humain au repos et dans les principaux mouvements. Paris: E. Plon, Nourrit et Cie., 1890, fol. viii, 110 pl.

———. Physiologie artistique de l'homme en mouvement. Paris: O. Doin, 1895, 8°. 335 pp., 6 pl.

RICHER, PAUL (1849——). Nouvelle anatomie artistique du corps humain. Paris: Plon, 1906, sm. 4°. vi+177 pp.

BRÜCKE, ERNST WILHELM (1819–92). Schönheit und Fehler der menschlichen Gestalt. Wien: W. Braumüller, 1891, 8°. 1 p.l., 151 pp.

By the professor of physiology at Vienna. A book of unusually attractive and informing character, illustrated with 29 small woodcuts of singular beauty by Hermann Paar. English translation, 1891.

ROTH, CHARLES. The student's atlas of artistic anatomy. Edited, with an introduction, by C. E. FITZGERALD. London: H. Grevel & Co., 1891, fol. viii+50 34 pl.

THOMSON, ARTHUR. A handbook of anatomy for art students. Oxford: Clarendon Press, 1896. 8°.

A work of solid merit, which has now reached its fourth edition. Illustrated with superb photographic plates of the nude, in brown tone, each plate having opposite a schema of the underlying muscles, with legends. The male and female models were chosen not for excessive muscularity, but for all-round symmetry and proportion. Far and away, the best modern treatise on the subject in English.

STRATZ, CARL HEINRICH. Die Schönheit des weiblichen Körpers. Stuttgart: F. Enke, 1898.

A treatise on artistic anatomy, based upon direct photography of female models.

———. Die Rassenschönheit des Weibes. Stuttgart: F. Enke, 1901, 8°. 350 pp., 1 map.

A study of the surface anatomy of the female body in its ethnic relations, illustrated by photographs from the nude.

———. Die Körper des Kindes. Für Eltern, Erzieher, Aerzte und Künstler. Stuttgart: F. Enke, 1903, 8°. xii+250 pp., 2 pl.

An admirable study of the surface anatomy of the female body in children, illustrated by photographs from the nude.

STRATZ, CARL HEINRICH. Die Darstellung des menschlichen Körpers in der Kunst. Berlin: J. Springer, 1914, 8°. x+322 pp.

Gives pictures of the principal works of art in which anatomy is exploited, frequently with duplicate poses by living models.

DUNLOP, JAMES M. Anatomical diagrams for the use of art students, arranged with analytical notes and drawn out by ———. With introductory preface by JOHN CLELAND. London: George Bell & Sons, 1899, roy. 8°. 4 p.l., 72 pp.

Illustrated with parti-colored drawings and photographs.

MCCLELLAN, GEORGE. Anatomy in its relation to art; an exposition of the bones and muscles of the human body, with especial reference to their influence upon its actions and external form. Philadelphia: A. M. Slocum Co., 1900, 4°. 142 pp., 41 l., 126 pl.

Illustrated by 338 original drawings and photographs made by the author. The drawings are mostly rude diagrammatic sketches. The photographs are elegant, well-selected album-pictures of the nude, many of them duplicating the poses and thus demonstrating the excellent anatomy of many antique and modern statues.

COLENSO, ROBERT J. Landmarks in artistic anatomy. London: Baillière, Tindall & Cox, 1902, sm. 4°. vi (1 l.)+56 pp. 6 outline pl.

RINKE, JAN. Handleiding tot het teekenen van het menschelijk lichaam. Amsterdam: H. Meulenhoff, 1906, sm. 4°. 142 pp., 1 l., 2 pl.

Illustrated with outline drawings.

TIKHANOFF, MIKHAIL TERENTYEVICH. Kurs plasticheskoi anatomii chelovieka (Human plastic anatomy). St. Petersburg: T. R. Golike & A. Vilborg, 1906, xïi+385 pp., 1 l., 2 pl.

SHUFELDT, ROBERT WILSON (1850——). Studies of the human form, for artists, sculptors, and scientists. Philadelphia: F. A. Davis Co., 1908, roy. 8°. xxxi+644 pp.

Illustrated by photographs of nude models.

FETZER, HERMANN (1846——). Einleitung in die plastische Anatomie für Künstler. Tübingen: H. Laupp, 1911, roy. 8°. vii+57 pp., 18 pl.

FRIPP, SIR ALFRED D., AND THOMPSON, RALPH. Human anatomy for art students, with drawings by INNES FRIPP and an appendix on comparative anatomy by HARRY DIXON. Philadelphia: J. B. Lippincott Co., 1911, 12°. 296 pp.

Contains 151 illustrations, among which are 23 effective photographs from the nude.

HEUPEL-SIEGEN, LUDWIG. Plastische Anatomie des Menschen für Künstler und Kunstschüler. Stuttgart: F. Enke, 1913, 4°. viii+96 pp., 93 pl.

Illustrated with 199 partly colored drawings of structure by Paul Mather and 8 crayon drawings of the nude body by the author, Philipp Hirt, Peter Abelen, and Theo. Riebecke.

VANDERPOEL, JOHN HENRY (1857–1911). The human figure. London, 1913, 8°.

LUTZ, EDWIN GEORGE. Practical art anatomy. New York: Charles Scribner's Sons, 1918, 8°. vii+254 pp.

Illustrated with very rudimentary outline drawings by the author.

HISTORY OF ANATOMICAL ILLUSTRATION

HYRTL, JOSEPH (1811–94). Antiquitates anatomicae rariores, quibus origo, incrementa et status anatomes, apud antiquissimae memoriae gentes, historica fide illustrantur. Vindobonae: In Biliopolo Universitatis, 1835, 8°. xii+13+109 pp., 2 l., 3 pl.

Gives a unique account of culinary, sacrificial, and accidental anatomy, with three plates of Chinese anatomy from Cleyer's Specimen medicinae sinicae (1682).

DUVAL, MATHIAS MARIE, AND CUYER, ÉDOUARD. Histoire de l'anatomie plastique. Les maîtres, les livres et les écorchés. Paris: Société française d'éditions d'art, 1898, 8°. xiii+351 pp.

A valuable manual, well written and well illustrated, containing much material and information not accessible to Choulant. It forms a supplement or pendant to his book.

DUVAL, MATHIAS MARIE, AND BICAL, ALBERT. L'anatomie des maîtres. Trentes planches reproduisant les originaux de Léonard de Vinci, Michel-Ange, Raphaël, Géricault, etc., accompagnés de notices explicatives et précédées d'une histoire de l'anatomie plastique. Paris: A. Quantin, 1890, fol. ii+32 pp., 29 pl., 30 l.

WEINDLER, FRITZ. Geschichte der gynäkologisch-anatomischen Abbildungen. Dresden: Zahn und Jaensch, 1908, 4°. xvi+186 pp., 5 col. pl.

The work of a Dresden gynecologist and executed after the plan of Choulant's treatise, which it surpasses in the interest and variety of its illustrations. These include *ex-voto* representations of the uterus, pictures from Greek vases, the medieval codices and MSS (particularly the Dresden No. 78), and plates from all the outstanding works on anatomy and obstetrics down to William Hunter (1774). Leonardo's female *situs viscerum* is given opposite p. 68, and his wonderful figurations of the statutory position of the *foetus in utero*, on pp. 73–74; interesting figures from the twelfth-century Copenhagen codex (1263), with Valentin Rose's text, on pp. 16–31. One of Gautier d'Agoty's nudes, with eviscerated fetus, is given in colors opposite p. 168.

DESCRIPTION OF ILLUSTRATIONS

FACING PAGE 45

Three illustrations taken from the first volume of the parchment codex in the possession of the Dresden Royal Library (Manuscripts D 92, 93) and containing the Latin works of Galen, as described in the article entitled "Anatomic Illustrations of Antiquity and of the Middle Ages." The first picture shows the instructor seated and pointing with his right hand at a nude woman standing beside him. To his left stand two students. It is to be found in Vol. I. fol. 50, and belongs as initial C to *Galeni de spermati lib. ii. cap. 1, de modo emissionis spermatis feminei ad matricem.*

The second picture again shows the instructor seated and a nude pregnant woman standing before him, with two students in the background also standing. The latter is to be found in Vol. I, fol. 158, and belongs as initial T to *Galeni de utilitate particularum lib. xiv., de utilitate partium genitalium.*

The third picture shows standing to the right of the seated instructor a nude man in the center of whose thorax (the lower part of which is dissected) the heart, shaped like a playing-card heart, can be seen. Below it, in the upper part of the abdomen, also dissected, suggestions of the liver and the stomach seem to be given. To the left of the instructor stand two students. This illustration makes it obvious that this picture as well as others were to give emblematic suggestions rather than to present actual demonstration, since a human being with his thoracic and abdominal cavities dissected could not have attended such a demonstration, standing and motioning with his hands. The last picture can be found in Vol. I, fol. 19, on the back of the page, and belongs as initial Q to *Galeni liber de motu thoracis et pulmonis.*

PAGES 46 AND 47

A. The Duchess from Hans Holbein's larger "Dance of Death," an original print of the wood-engraving cut by Vicomte Léon de Laborde for C. Fr. von Rumohr's book: *Hans Holbein der jüngere in seinem Verhältniss zum deutschen Formschnittwesen*, Leipzig, 1838, 8°, woodcut plate.

B. The initial X from the "Dance of Death" alphabet or the smaller "Dance of Death" by Hans Holbein. It is copied from the Greek edition of Galen, *Basil, apud Andr. Cratandrum*, 1538, fol., 5 volumes, in which this alphabet provides the initials. It represents two gamblers surprised by death and the devil, and has also been used in the second part of woodcuts of famous masters edited by the publisher.

PAGE 103

Pen-and-ink drawings from Leonardo da Vinci's anatomic sketches in the possession of the King of England. The plate is taken from John Chamberlaine: *Imitations of original designs by L. da V.*, London, 1796, large fol., a work which was later inserted in *Original designs of the most celebrated masters of the Bolognese, Roman, Florentine and Venetian schools*, etc., London, 1812, large fol., Plate IV, by the same author, cf. Weigel: *Kunstkatalog* No. 11372. The plate given here contains illustrations explaining the movements of the shoulder and the upper arm and therefore shows

also the muscles of the neck, the thorax, and the upper arm. Of the six figures on the plate, the one in the upper right-hand corner is schematic and illustrates the mechanism of motion. The other figures are artistic conceptions of the anatomy of the various parts involved, and sufficiently true to nature, of a kind that had not yet been given by any of the other anatomists of that time. They are all accompanied by ten numbered explanatory notes in mirror writing.

PAGE 107

A print copied from the rare copper engraving by Giovanni Fabbri after a pen-and-ink sketch of Michelangelo Buonarroti. It represents a nude male figure with suggestions of the muscles; to the left of the figure is a drawing pertaining to proportions. The characters on this drawing are in Michelangelo's own handwriting and are on the original engravings, as follows: (1) Along the perpendicular: *testa*, *collo*, *peto* (*petto*), *soto peto* (*sotto petto*), *col corpo*, *natura*, *coscia*, *congiunta*, *gamba*, *congiata di piedi;* the last words in the copy are indistinct owing to damage. (2) Along the horizontal: *spala* (*spalla*), *congionta*, *oso* (*osso*) *di sopra*, *congionto*, *oso di soto* (*osso di sotto*), *congionto*, *oso* (*osso*) *de la mano*, below, at the clavicle: *Inquruatura sopra il petto.*

PAGE 110

Anatomic study in pen-and-ink by Raphael for the sepulture in the Villa Borghese, representing the fainting Mary supported by two women, the skeleton sketched in. The heads belong to the same picture. The copy is after the facsimile in the Lawrence Gallery.

PAGE 113

An outline vignette representing water and earth. Taken from a larger copperplate in oblong folio, completely crosshatched, for which it serves as an accessory. The copy is of the original size. The larger plate belongs to the rare work with copperplates: *Hystoria Jasonis Thessaliae Principis de Colchica velleris aurei expeditione: cum figuris aere excusis earumque expositione, versibus Priscorum Poëtarum, Ab Jacobo Gohorio Parisiensi*, Paris, 1563, oblong folio, 4 pages of text and 26 copperplates. The artist of the plates is Leonard Thiri of Deventer (also called Leo Davent), a pupil of Rosso. The engraver is René Boivin. The main compositions in the centerfield, containing scenes from Jason and Medea, are done in the style of Luca Penni. The rich, surrounding accessories are done in the style of Rosso, Maître Roux; and in connection with these accessories it should not be overlooked that in the Preface the author expresses his hopes that the king will have tapestries woven or mural paintings executed after these plates, i.e., will have them reproduced on a large scale. Our sketch is taken from page 9 of this work. Cf. Robert-Dumesnil: *Le peintre-graveur français*, *VIII*, 36, Paris, 1850, 8°; Weigel: *Kunstkatalog* No. 17056. The insertion of this sketch after the article on Rosso should be excused on the ground that it might well be taken for Rosso's work, as far as its composition is concerned.

PAGE 114

An anatomic sketch comprising four complete figures, viz., two skeletons and two musclemen, after the exceedingly rare engraving by Domenico Fiorentino (Dom. del Barbiere) based on the sketches by Rosso de' Rossi (Maître Roux). Moehsen ascribed the drawing to Buonarroti but it cannot be his. The anatomy on the whole is inaccurate and not without arbitrary features and mistakes. Observe on

the first skeleton, the clavicles, the bones of the forearm, the carpus, the patella, the tarsal bones; on the second skeleton, the pelvis, the carpal and tarsal bones. The back of the second muscle-manikin is treated in a very arbitrary manner.

PAGE 118

The dissection from Joannis de Ketham: *Fasciculus medicinae.* The copy is made from the older and better engraving, as found on the back of page fii in the Italian translation by Sebastiano Manilio, Venez., 1493, fol. 5. February. Cf. another illustration of a dissection from a somewhat later period, on p. 141.

PAGE 121

The sign of the zodiac Aquarius, taken from a plate in Joannis de Ketham: *Fasciculus medicinae*, Italian translation by Sebastiano Manilio, Venez., 1493, fol. 5. February, page bij. On that plate the signs of the zodiac are drawn upon various parts of a male body, which they are supposed to rule. The Aquarius stands between the feet of the figure.

PAGE 125

A very crude woodcut from Magnus Hundt: *Antropologium, Lipsiae*, 1501, 4°, page Lij. It shows schematically, without any attempts at faithful representation, what conceptions people of the early Middle Ages and, in some respects, even those of the fifteenth century must have had of anatomy from descriptions of the Arabians, for Mundinus is everywhere by far more accurate in his descriptions. On the right side of the neck may be seen the somewhat narrower trachea entering the lung, on the left side the somewhat wider oesophagus. Within the thorax are shown the undivided lungs, and to the left the heart, shaped like a playing-card heart, with the large vessels and with its apex pointing to the left. In the boundaries may be noticed the dissected pericardium and the incised border of the dissected lung. The diaphragm is not indicated; on the right of the abdominal cavity is shown the five-lobed liver embracing the base of the stomach with the gall bladder on its upper surface. On the left is the bottle-shaped stomach with the oesophagus entering it and a blood vessel connected with the spleen entering side by side. Near the base of the stomach, the intestines separate from the stomach. The organs at the lower right side of the abdominal cavity should be thought of as standing upright and dissected. Obviously they were placed obliquely in order to render them visible. They are the urinary and sexual organs. The upper staff from which the two other staffs branch off to enter the larger balls, is the inferior vena cava, called at that time *Vena chilis*, κοιλίης, with the two *Venae emulgentes* or renal veins. The balls are the kidneys, from each kidney a shorter staff leaves to enter an elongated body; this is the ureter passing into the bladder. A longer staff leading from each kidney outward into a smaller ball, is the spermatic cord. Each ends in its testicle. The title of the plate is given in the work itself as *Figura de situ viscerum.* Compare this with a similar but more correct anatomic figure on p. 131.

PAGE 131

A plate from Laurentius Phryesen: *Spiegel der Arzney*, Strassburg, 1518, 4°. It represents the anatomy of the Middle Ages, as it originated with Mundinus, in respect of the viscera of the three cavities. In the abdominal cavity, immediately below the diaphragm, the five-lobed liver, an old Galenic error based on zoötomy, which

Mundinus somewhat mitigates by saying: *quinque pennulae eius licent in homine non sint separatae semper ad invicem* ("though its five lobes are not always separate from one another in the case of man"). Below it the round stomach, on one side of it the spleen, below it the kidneys with a blood vessel entering from above; below them the ureters leading into the bladder. Behind it the aorta and the inferior vena cava with its branches. The intestines are taken out and placed alongside the abdominal cavity. In the thoracic cavity the heart lies in the median line of the body, with its apex pointing to the left. In accordance with the concept of these times, the heart is represented as entirely surrounded by the left lung, just as Mundinus says: *apparebit pulmo in medio cuius existit cor velatum pennulis pulmonis* ("see the lungs in the midst of which the heart lies, veiled by the pulmonary lobes"). Above, the trachea is shown coming from the lungs, with the oesophagus in back of it. The brain is represented in six separate figures. The first figure only crudely suggests the cerebral convolutions and the separation of the two hemispheres of the cerebrum. The second is supposed to represent the large middle "brain cell" (*Cellula or Ventriculus anterior*) partitioned by a part which Mundinus calls *Vermis*. In the figure, this part is shown lifted out by means of a peg. The represented parts are what we now understand to be lateral ventricles, which were then thought to be joined, and the corpus callosum. The peg in the back leads into an alleged posterior brain cell (*Cellula or Ventriculus posterior*) or probably what we now understand to be the fourth ventricle. A similar representation is shown in the third figure, the middle ventricle without the corpus callosum. At the forward end can be seen the right optic nerve and the attachment of the dura mater to the crista as the beginning of the falx cerebri. The fourth figure shows the optic nerves with their decussation, and, at the back, the upper opening of the posterior "brain cell." The fifth figure shows the decussation of the optic nerves, cut off in back and in front, also the inner base of the skull lined with the dura mater, and, at the back, the tentorium cerebri open in the center. The sixth figure shows the cerebrum turned back, at the front the chiasm of the optic nerves sectioned from the rear; behind it three pairs of nerves originate. The seventh figure shows the tongue with the upper opening of the trachea and behind it, the oesophagus. On the whole, a much better executed illustration than that of Magnus Hundt on p. 125. Regarding the alleged artist and wood engraver of our plate see pp. 130 and 131.

PAGE 141

The dissection on the title-page of Jacobus Berengarius de Carpi: *Isagogae breves*, Venetiis, 1535, 4°, in the size of the original. Just as in the illustration of the dissection on page 114 of Ketham, the instructor is seen demonstrating from the lecturer's platform but not working with the cadaver. Besides him, we see a man with a small staff, seemingly directing the dissector; then the dissector himself, his head covered, but not in wide garments; his forearms are bare, the right one holding a large knife (Ketham's has a curved one, here there is a straight knife). In addition, there are six persons and a servant who is left out in Ketham's plate. On both plates, the dissector stands to the right-hand side of the cadaver; Ketham shows a male body; here a female is shown. The artist must either have had before him Ketham's plate, or convention must have led to the uniformity of these representations of a public dissection. It might be of importance to know several other drawings of the same or an immediately succeeding period.

PAGE 150

An illustration from Canani: *Musculorum humani corporis picturata dissectio. S.l. et a.* 4°, on the back of page *Bij*, representing the common superficial flexor of the fingers (*flexor digitorum communis sublimis*) of the size of the original. The picture, while reproduced here in a horizontal position, is upright in the original with the hand down. The origin is correctly shown from the internal condyle of the humerus but the muscle is not attached to the radius and the insertion at the fingers is inaccurate.

PAGE 153

A plate from Caroli Stephani: *De dissectione partium corporis humani libri tres.* Paris, 1545, fol., page 250, representing a seated male figure with the cranial cavity opened. The inscription on the side is as follows: *A. crassa meninx, à cranio revulsa. B. Locus cui insidet aden colatorius. C. Quo in loco arteria carotis conspicitur ad retiformem plexum deferri. D. Locus in quo reperitur membrana ad aurem pertinens. E. Divisio nervi tertiae coniugationis. F. Origo spinalis medullae. G. Lacuna in palatum commeans, ad expurgandum cerebrum. H. Cavitas insignis supra oculum, inter parietes ossis coronalis conclusa, sub prominente supercilii tuberculo. I. Oculus osse detectus.* The original has this explanation printed in type.

PAGE 154

A plate from Carolus Stephanus: *De dissect. partium c. h. libri tres*, Paris, 1545, fol., page 271, representing a pregnant woman in a semi-recumbent position, with her abdominal cavity and uterus dissected, so that one sees the amnion, to which the inscription, printed in type, on the small plate refers: *A. Secundina dissecta, usque ad allantoidem. B. Facies secundinae, ad allantoidem pervenientes.*

PAGE 161

Illustrations of several bones after a clever red-crayon drawing by Stephan von Calcar, a present from Baron von Amstetter, Judge of the Court of Appeals, of Breslau, in the possession of the publisher. It bears the almost unknown signature of the master and is signed in ink, in old Dutch handwriting: *Jan van Kalkar.* One should compare with it the very similar composition and the skull in Vesalius: *De corporis humani fabrica, Basil.*, 1543, fol., pp. 5 and 20, and in the edition *Basil.* 1545, fol., pages 6 and 26. Almost all the woodcuts are reversed and since the handwriting is undoubtedly genuine it must be assumed that Vesalius had the sketches transferred upon the wood blocks without mirrors, at least in all illustrations in which right and left were out of consideration. The subjects represented in our plate are as follows: An external view of the left innominate bone; the right metatarsus with the toes; the right tarsus, the inferior maxilla, twice; a skull, and seven illustrations pertaining to the apophyses and the cartilages of the femur, which are not found represented in the same way by Vesalius. The difficult task of reproducing a crayon drawing in a woodcut has been most successfully accomplished by the artist, Eduard Kretzschmar, of Leipzig.

[This drawing has since disappeared. Some of the bones are identical with those in the Glasgow codex, described by Roth in the *Arch. f. Anat.*, 1906, pp. 77–110. Plates II and III of the Glasgow codex bear the same signature, *K*, in monogram (that of Kalkar) and have the same artistic quality.]

PAGES 174 AND 175

The three skeletons from Andreas Vesalius' first six plates, *Venet.* 1538, fol., which are essentially different from those contained in his principal work *De corporis humani fabrica*, published in 1543.

PAGE 179

A skeleton from Andreas Vesalius: *De corporis humani fabrica, Basil.*, 1543, fol., p. 165, and in the edition *Basil.* 1555, fol., p. 205. This skeleton is not in the *Epitome*. In the principal work, as originally conceived, it is the third of the skeletons represented. This skeleton makes one think of one of the mourning apostles in a "Burial of Christ" by Titian.

PAGE 188

A greatly reduced reproduction of the rare plate by Macrolios of a sketch by Vesalius or Stephan von Calcar, printed after the original or a copy of it and published without Vesalius' knowledge. The explanatory lettering is omitted. The brain is shown from above, opened by means of a horizontal section and so exposed by the removal of the upper part that one looks directly into the two lateral ventricles with the corpus callosum between them. From the base of the brain the olfactory nerves are seen originating as two short stumps, which Vesalius did not consider to be nerves. Below these is seen the chiasm of the optic nerves, with their continuations into the eyeballs. Below the optic nerves runs the third or sixth pair (*nervus oculomotorius* or *nervus abducens*) and below that the first branch of the fifth pair (*ramus ophthalmicus*). The two anterior descending trunks are the third branch of the fifth pair (*ramus maxillaris inferior*) and the sphenopalatine nerve (*nervus sphenopalatinus*), the former with its distribution in the tongue, the lower larger body, and the latter widening into the palate, the upper smaller body. The still higher, small round body represents the widening of the eighth pair (*nervus acusticus*) into the internal auditory organ and is not supposed to represent the hypophysis as one might be led to believe. Farther back is shown the branching of the tenth pair (*nervus vagus*) in the thoracic and abdominal cavities and the first three pairs of the spinal nerves. With this should be compared the much better and more complete plate in Vesalius' principal work *De corporis humani fabrica*, Book IV, p. 319, 1543 edition, and page 512, 1555 edition. This plate also proves the fact that Macrolios' representation is actually a Vesalian representation, only given earlier, namely in 1538.

PAGE 191

A plate taken from Jobst de Necker's reproductions of the first six plates by Vesalius of 1538. A front view of the skeleton with the right forearm bent at the elbow and raised.

PAGE 207

A plate from Valverde de Hamusco: *Historia de la composicion del cuerpo humano*, after the Italian translation *Roma, 1560*, fol.; liber ii. tab. 1. A muscle-manikin showing the outer muscle-layer of front view of the body. The muscleman is holding the removed skin in his raised right hand and a dagger in his lowered left hand. The left foot is resting on a stone. This is one of the illustrations which Valverde added as his personal contribution to the Vesalian plates, but it is less true to nature than Vesalius' own myologic representations.

PAGE 215

An illustration from Constantinus Varolius: *De nervis opticis, Patav.* 1573, 8°, on the back of page 17. This older representation is chosen rather than the newer engraving in the edition of 1591, because Varolius was dead at the time of the publication of this latter edition and the re-engraving was done arbitrarily and not accurately enough. This figure is particularly instructive when compared with Vesalius' illustration of the base of the brain in his principal work *De corporis humani fabrica* (edition 1543, p. 318; edition 1555, p. 511), as it shows the progress made by Varolius, e.g., in the course of the optic nerves behind the chiasm, the optic tract, the twisting of the crus cerebri, half of the pons Varolii, and so forth. On the other (the left) hemisphere the pairs of nerves then known can be distinguished; at the frontal part the two olfactory nerves, the chiasm of the optic nerves with the thalamus (1), of the two nerves running jointly beneath the left eyeball the inner one is made up of the *Nervus oculomotorius* and *abducens*, the outer one is the *ramus ophthalmicus* of what is now termed the fifth pair. The nerves marked 3 and 4 are the *ramus maxillaris superior* and *inferior* of this same pair. The nerve with the club-shaped end marked 5 is the *nervus acusticus* and *facialis;* the trunks numbered 6 and 7 are nerves of the medulla oblongata, especially the *nervus vagus.*

PAGE 219

An illustration from the second edition of Juan de Arphe: *Varia commensuracion para la escultura y arquitectura*, Madrid, 1675, fol.; second book, page 30. The front view of a muscle torso with the commencement of the neck, the arms, and the thighs. A strong and artistically original representation, natural enough considering the time of its production, the second half of the sixteenth century.

FACING PAGE 226

[In deference to current taste, the original Casserian figure, chosen from Spieghel by Choulant, representing a pregnant woman mounting a pedestal, has been omitted on account of the obtrusive prominence of the pudendum, which is represented as shaven. For it Dr. Frank has substituted what is unquestionably the most beautiful of all the drawings made by Fialetti for Casserius. It represents an eviscerated female figure, of lovely proportions, apparently floating in mid-air, in the rapt, ecstatic attitude of some transfiguration scene of Raphael or Correggio. In sheer beauty, this figure is comparable with the robust goddesses in the Aurora Fresco of Guido Reni in the Rospigliosi Palace at Rome.—F. H. G.]

PAGE 227

A print from the plates of Pietro Berrettini da Cortona, Plate IV, and taken from representing a newborn child with the umbilical cord. In the dissected abdominal cavity, the liver, intestines, and urinary bladder are visible. From the latter ascends the dissected abdominal cavity on the left side of the main figure, are omitted on this plate. The stone, however, on which the smaller figure stood and the small plate leading to the liver. The copy is reduced less than one-half. The placenta represented on the original plate has been omitted. The incorrect representation, that all four vessels appear to unite at H, is identical with that of the original and must

be ascribed to the artist since such an anastomosis would not have agreed with Spigelius' views.

The child resembles in many ways Guido Reni's "Sleeping Cupid," a picture which Carlo Faucci engraved in copper.

PAGE 230

Muscular body from the sketchbook of Jean Paul Rubens.

PAGE 236

A print from the plates of Pietro Berrettini da Cortona, Plate IV, and taken from the older edition in which the accessory figures added by Petrioli are given. In Petraglia's edition, both the diaphragm on the right side, and the small figure with the dissected abdominal cavity on the left side of the main figure, are omitted on this plate. The stone, however, on which the smaller figure stood and the small plate leaning against it, with the monogram of Luca Ciamberlano, are left on. Some crosshatching on the top of the stone serves to obliterate the traces of what had previously been there. Yet the places where the thighs of the figure stood are still quite distinctly noticeable. The large figure is holding in the left hand the removed sternum with the costal cartilages and the soft parts between them. One should especially notice the way in which the nerves have been distinguished from the other organs, and also how, by means of crosshatching, the great blood vessels have been brought out. This is best brought out in the case of the femoral artery and the femoral vein of the right thigh and in the blood vessels of the right leg running parallel with the nerves of the leg. On the head and in the thorax, also, the nerves have been given particular attention.

FACING PAGE 242

A reproduction of the famous picture, the "Lesson in Anatomy" of Nicolas Tulp, painted in 1632 by Rembrandt van Ryn (born in a mill near Leyden on June 15, 1606, died in Amsterdam, October 8, 1669) for the physician and burgomaster Nicolas van Tulp (Tulpius) (b. Amsterdam October 11, 1593, d. Amsterdam 1674). Tulp presented it to the anatomic theater (*Snijkamer*) in Amsterdam. In 1828 it was to have been sold at auction for the benefit of the widows of Amsterdam surgeons and, indeed, it had almost been brought to England by the art-dealer C. J. Nieuwenhuys, when, in the same year, the King of the Netherlands acquired it for thirty-two thousand florins and retained it for his country. Since that time it has been in the Royal Museum at The Hague, but before being placed on exhibition it was restored by Kruseman.

Tulp was neither a professional anatomist nor a professor, but a practicing physician, who later became a member of the council and burgomaster. As such he rendered considerable service to the city. His son-in-law was the burgomaster, Jan Six. Tulp was the author of only one small book entitled *Observationes medicae*, Amsterdam, 1641, 8°, which contains a few illustrations pertaining to pathologic anatomy and natural science. [It contains one of the earliest accounts of beriberi, edition of 1652, pp. 300–305, preceded only by that of Jacob Bontius: *De medicina Indorum*, Leyden, 1642, pp. 115–20.] The book was republished several times. Editions after 1716 contain his biography. From this work it appears that Tulp

occupied himself with anatomy. On the picture (64½ inches high, 83½ inches wide) he is shown, with his head covered, demonstrating the muscles of the arm on the left arm of a male cadaver; opposite him are sitting Adrian Slabbraan (Slalbraan) and Jacob Koolveld, to the left of the former; bending well forward over the head of the cadaver is Jacob de Vit; to his left and immediately to the right of Tulp stands Mathys Kalkoen; behind these two men appears Jacob Block and behind him, in the background of the picture, Frans van Loenen; the figure holding in his hand a manuscript with the names of those in the picture, is Hartmann Hartmansz. The picture was intended to have been hung, with the "Lesson in Anatomy" of Tulp, in and later, in 1851, by Cornilliet who made a somewhat flat representation in mezzotint.

[Rembrandt painted in 1656 a companion-piece to the "Lesson in Anatomy" of Tulp, representing Johannes Deyman, the overseer of the College of Medicine at Amsterdam, beside a cadaver lying on its back with the feet turned toward the spectator. The only portions preserved of the original are the foreshortened dead body, the arms and hands of Deyman in the act of demonstrating above the head, and the figure of a second demonstrator, holding the removed calvarium. This picture was intended to have been hung, with the "Lesson in Anatomy" of Tulp, in the Anatomical Hall at Amsterdam, and was severely damaged by fire on November 8, 1723. Later it was restored, and at an auction on February 7, 1842, was sold for 666 gulden to an English art-dealer who brought it to London, as related by Ed. Kolloff in Raumer's *Historisches Taschenbuch*, 1854, p. 574. The picture is now in the Rijks Museum at Amsterdam.]

PAGE 251

A plate from Godefridus Bidloo: *Anatomia humani corporis, Amstelodami*, 1685, large fol. tab. 87, after the drawing by Gerard de Lairesse. It represents a standing skeleton with an hourglass in the left hand; an open portico and a sarcophagus with cover removed, and another with cover closed, a view over inhabited country. The proportions of the skeleton are ugly, and the details inaccurate and false.

PAGE 259

A copy of the very rare print by Crisóstomo Martínez, a Spaniard, showing views of the superficial muscle-layers of the back, the side, and the front. Beside these figures is the skeleton of a child. Several of the proportional lines crossing the picture had to be omitted for the sake of clearness, but all those belonging together have been left.

PAGE 282

A plate from Bernhard Siegfried Albinus: *Tabulae sceleti et musculorum corporis humani, Lugd. Batav.*, 1747, large fol. tab. I; representing the male skeleton in its most perfect form and its peculiarities. The figure is drawn in reverse with omission of all accessories. Cf. the female skeleton on p. 305.

PAGE 305

The plate from Samuel Thomas Soemmerring: *Tabula sceleti feminini juncta descriptione, Trajecti ad Moenum* (Frankfort on the Main), 1797, large fol. represents the female skeleton in its most perfect form and its peculiarities. The figure is drawn in reverse and greatly reduced. Cf. the male skeleton, p. 282.

PAGE 322

Front view of Fischer's anatomic muscle statuette after a sketch by Jacob Merz, in the possession of the publisher, who came into possession of the entire art estate of Jacob Merz. The collection comprises 471 pages of anatomic studies, portraits, scenes and landscapes, and fills three folio volumes.

PAGE 333

An illustration of the Borghese Gladiator with the skeleton sketched inside. Taken from Galbert Salvage: *Anatomie du gladiateur combattant*, Paris, 1812, large fol. Plate VIII. Greatly reduced, but otherwise accurately reproduced from the original. Consequently a few parts, not entirely true to nature, such as the right hip joint, the left elbow joint, and others, should, therefore, be credited to the original.

PAGE 338

An osteologic illustration of the back view of the pelvis and the trunk, with the shoulder and hip joints. Taken from *Tavole anatomiche disegnate del pittore Giuseppe Bossi, Milano, s.a.* large fol. Plate IV.

PAGE 342

An osteologic figure from the plates which had been made from drawings by John Flaxman and were published after his death under the title: *Anatomical studies of the bones and muscles for the use of artists from drawings by John Flaxman*, London, 1833, large fol., Plate V. It represents the bones of the trunk and the pelvis with the upper ends of the femur foreshortened. Through the pubic arch one is given a view of the inside of the pelvic cavity; above the pubic symphysis can be seen the whole interior of the thoracic cavity. This picture is obviously a study and not intended to be used for instruction, since for such a purpose it would have had to be more accurate. The original is done in aquatint.

PAGE 344

A figure from Burkhard Wilhelm Seiler: *Anatomie des Menschen für Künstler und Turnlehrer, herausgegeben von Aug. Friedr. Günther*, Leipzig, 1850, 8° and large fol. Plate VII, fig. 4. It represents a female body with the skeleton drawn inside and the proportional lines, indicating a height of eight heads. The five subdivisions of each space between two lines are each equivalent to the height of the lower jaw up to the parting of the lips. The figure had already been used in Galbert Salvage: *Anatomie du gladiateur combattant*, Paris, 1812, large fol. Plate XIX.

PAGE 345

The Dying Gaul of the Capitol with the skeleton drawn inside, taken from Burkhard Wilhelm Seiler: *Anatomie des Menschen*, etc., *herausgegeben von A. F. Günther*, Leipzig, 1850, 8°, and large fol. Plate VIII, fig. 2.

PAGE 350

The country peddler from Hans Holbein's larger "Dance of Death." Death clutches the peddler and the skeleton standing behind both, covered with more flesh than Death, plays with a bow on a one-stringed instrument used in former times and called the marine trumpet (*Trumscheit, Trompète marine*), which he is holding upside down, however. Cf. p. 47.

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